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OUTCOMES OF AN INFECTION PREVENTION / HEALTH PROMOTION PROGRAM IN THE CHILD DAY-CARE CENTRE

by

Deborah Phillipchuk

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirements for the degree of Master of Nursing.

Faculty of Nursing

Edmonton, Alberta

Spring, 1992

Running Head: OUTCOMES: DAY-CARE

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The undersigned certify that they have read, and recommended to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled OUTCOMES OF AN INFECTION PREVENTION / HEALTH PROMOTION PROGRAM IN THE CHILD DAY-CARE CENTRE submitted by Deborah Phillipchuk in partial fulfillment of the requirements for the degree of Master of Nursing.

Dr. M. Wood

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Dr. W. Wenman

March 16, 1992

Dedication

This thesis is dedicated to my children, Natalie Lynn and Ian Andrew, and to my husband, Jim, whose support and encouragement enabled me to do this.

Abstract

There is an increased need for child day-care centres in today's Canadian society. Parents, caregivers, and health professionals have been concerned regarding the frequency and transmission of enteric and respiratory infections in these child day-care centres. Epidemiological evidence supports and documents these concerns. The purpose of this evaluation research study was to examine the outcomes of an Infection Prevention/Health Promotion Program in two private Edmonton day-care centres accepting infants and toddlers. The targets of the intervention were handwashing behavior of day care staff members and self-care activities of the children, focusing on increasing knowledge and skill. The intervention consisted of a workshop presentation and follow-up visits by the researcher every two weeks during the posttest data collection period. Outcome measures evaluated included the number of symptoms of infection, the number of days children were absent due to infection, and the number of prescription medications given in the day care. Because the intervention day care had a higher rate of infection than the control day care throughout the study, comparisons between groups could not be made. Within the intervention day care itself, there was an increase in the number of respiratory symptoms in the posttest time period due mainly to a significant increase in respiratory symptoms in the toddler age group. However, there was a significant reduction in the number of days children were absent due to illness in the intervention day care in the posttest time interval. In addition, there was a trend toward posttest reduction in the number of prescription medications given in the intervention day care.

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Introduction

An increasing number of women are choosing to return to work following the birth of their child. A report by the National Council of Welfare (1988) stated that 57% of mothers with children under three years of age work outside the home, most of them full-time. For both dual career and single parent families, finding quality care for their children is a major concern. Many parents choose day-care centres because they are more stable than a private baby-sitter and there is less likelihood of unknowingly placing the child in an abusive situation (Canadian Advisory Council on the Status of Women, 1988).

While the child day-care centre may seem like the best choice for several reasons, group care of children is not without its problems. Clinical experience as well as a review of the literature (Pickering, 1987, and Wald, Dashefsky, Guerra, & Taylor, 1988) documented concern about the frequency and transmission of infectious disease within the day-care setting. The purpose of this evaluation research study was to examine the outcomes of a proactive approach to infections in the child day care, through an infection prevention/health promotion program.

Chapter One of the thesis introduces the conceptual framework upon which this evaluation research study was based and reviews the literature. The review of the literature: (1) describes the social context of the study, (2) discusses the epidemiological evidence concerning the frequency and transmission of infection within the day care setting, and (3) identifies the behaviors which are linked to this problem.

In the second chapter of the thesis, the rationale for the study is explained and

the specific hypotheses are presented. Predisposing, enabling and reinforcing factors that may affect health behavior in a day care are discussed in relation to their possible impact on the hypotheses that were developed.

Chapter Three discusses the research design and methodology of this study. A description of the research design, sample, methods and procedures, and ethical considerations are discussed.

In Chapter Four, the intervention and implementation of the study is described. Points discussed in this chapter include: the basis of the intervention; the intervention itself; visits to the day care by the researcher; follow-up for teaching the children about handwashing; monitoring the implementation; liaison with the Edmonton Board of Health; staff participation; the attrition and entry of staff and children to the day care; and problems encountered during the study.

The findings are presented in Chapter Five. Results of the pretest and posttest questionnaires as well as the data analysis of the outcome measures are presented.

In Chapter Six, the study findings are discussed. The PRECEDE model is reviewed to assess all the factors that may have had an influence on the study. The strengths and limitations of the model are also discussed. Chapter Seven provides a summary of the research study and offers recommendations for further research.

Chapter One: Conceptual Framework and Literature Review

A. Conceptual Framework

The PRECEDE framework proposed by Green, Kreuter, Deeds, and Partridge (1980) is the conceptual framework with which this health education program was organized. The word PRECEDE stands for "predisposing, reinforcing, and enabling causes in educational diagnosis and evaluation" (Green et al, 1980 p. X). It is important to note that the PRECEDE model is the framework for the analysis of the problem, organization, and process of development of this research study. Theoretical concepts applicable to the study were, however, derived from the search of the existing literature.

Green et al (1980) defined health education as "any combination of learning experiences designed to facilitate voluntary adaptations of behavior conducive to health" (p. 7). He suggested that health education activities are interventions that attempt to maintain positive health behaviors or interrupt negative behaviors that increase the risk of illness, disability, or death. Health education is the bridge between information and practices.

The PRECEDE framework was founded upon principles and theories from epidemiology, social/behavioral sciences, administration, and education. It emphasizes two propositions. The first is that health and health behavior are caused by many factors. The second proposition is that health education activities must be multidimensional if they are to effect behavior change. In synthesizing epidemiology, social/behavioral sciences, administration, and education, the framework gives direction and a focus to health education programs.

The PRECEDE framework consists of seven phases. In the first phase, a general problem or concern of a particular population is identified and documented. The social context of the problem is put forward. It is important to note that there must be agreement between the health educator and the client on the identification of the problem or concern.

In the second phase, specific health problems resulting from the social concerns in the first phase are identified. Available data, together with epidemiological evidence, are used to prioritize health concerns.

The task in phase three of the framework is to link the health problems with health related behaviors. It is important to be specific as it is these behaviors that are the target of the intervention. In addition to health behaviors, nonbehavioral factors are also noted in this phase. There is a recognition that the factors, though indirect, can influence health. The nonbehavioral factors include economic, genetic, and environmental considerations. Awareness of the factors alerts the researcher and educator to the limitations of the program or study.

Phase four of the PRECEDE framework consists of identifying factors which have the potential to affect health behavior. Green et al (1980) classify these as predisposing, enabling, and reinforcing factors. Predisposing factors are the personal knowledge, attitudes, beliefs, and values of an individual. The factors will either facilitate, or hinder health behavior and motivation to change. Enabling factors make it possible for motivations and aspirations to become reality, or put up barriers to their realization. They include such things as personal skills, personal resources, and community resources. Reinforcing factors consist of the feedback received from others. This feedback may serve to encourage or discourage the behavior. The identification of

the predisposing, enabling, and reinforcing factors leads into phase five where a decision is made on which of the factors will be the focus of the intervention.

Phase six consists of the actual development and implementation of the health education program. An assessment of anticipated administrative difficulties is necessary at this point. It is important to assess available resources in terms of the selection of interventions.

The final phase of the PRECEDE framework is that of evaluation. Although it is last, it is an integral part of all previous phases.

B. Review of the Literature

1. Social Diagnosis

To identify problems in the area of child day care, general articles on the social context of the subject were reviewed. In Canada, the Report of the Task Force on Child Care (Status of Women, 1986) was released in 1986. This document was studied as well as other related reports which discussed the day care situation or commented on the Task Force recommendations. From this review of the literature, the general problems were identified, including their background in Canadian day care.

The traditional family, where the father is the breadwinner and the mother stays at home to look after the children, is no longer the norm in today's Canadian society (Status of Women, 1986). Of women with children under the age of three, 57% are in the labour force (National Council of Welfare, 1988).

Women return to work following the birth of a child for various reasons. Some must work because of financial necessity either as a result of being a single parent or because one income is insufficient to meet the family's needs. Other women return to

work because they want and like to do so. Society has placed an increasing emphasis on the importance of a woman's career. Since the 1960's, more and more women have sought higher education or nontraditional careers (Crowley, 1988).

The major issue for women who have children and are returning to the work force is that of child care (Kamerman, 1980). In the past, young mothers and middle aged women cared for children on an informal basis in their own homes, but now these women are in the work force themselves (Status of Women, 1986). Caldwell (1991) noted that in the U.S. between 1965 and 1985, the percentage of children being cared for in private homes decreased from 37% to 13%, while the use of a day-care centre or preschool increased from 8% to 30%. In Canada, the number of day-care spaces has increased 10-16% each year (except for two years) since 1973 (Minister of Supply and Services, Canada, 1987). Although the number of day-care spaces has been steadily increasing, it has been estimated that in Alberta only 20% of children needing care are enrolled in child day-care centres (National Council of Welfare, 1988).

The report of the Task Force on Child Care (Status of Women, 1986) strongly emphasized the need for more day care spaces across Canada. They suggested a national care system similar to the health care and educational systems we now have.

Pressure has been building on governments to deal with the issue of child care. There is demand for increased subsidized day care space for all age groups. Before large scale increases in day care spaces are available, one must ask the question, "What are the implications, with regard to health, of group care of children?" In the Report of the Task Force on Child Care (Status of women, 1986) and other related literature which looks at the social context of day care, little if any mention is made of the health of children in day care. Green et al (1980) suggested that in phase two of the PRECEDE framework,

one must look at health problems associated with the social concerns identified in phase one, using epidemiological or medical findings.

2. Epidemiological Diagnosis

To ascertain the epidemiological evidence pertaining to child day-cares, a search of the literature was conducted for the years 1983 to 1992. While the literature on the social context of day care contains little information on health/illness in day care, the epidemiological literature is replete with articles on this topic.

Several studies have shown that children in day-cares have higher rates of illness than those cared for in their own homes or in family day homes (Wald, Guerra, & Byers, 1991, Johansen, Leibowitz, & Waite, 1988, and Bell et al, 1989). In a Swedish study (Petersson and Hakansson, 1989), reasons for absence and antibiotic consumption, as a reflection of the rate of illness, were compared between day-care centres and family day homes. A higher rate of absence was found which was attributable to infections in day-care centres for all age groups.

It has been estimated that parents lose 4.7 workdays per year due to diarrheal illness and 13 workdays per year due to all illnesses in these same children when the child is cared for in a child day-care centre (Pickering, Bartlett, & Woodward, 1986). Increased illness in children also places a burden on the health care system due to more frequent visits to physicians, laboratory tests to confirm illness, and treatment costs. Haskins (1989) estimated that illness in child day-cares cost an additional $1.8 billion per year to American families and society.

The research on health problems in day care is epidemiological in nature utilizing case control or cohort study designs, as well as investigations of outbreaks of

disease. Case control studies have established that attendance at day care is a risk for primary invasive Haemophilus influenzae infections (Istre, Conner, Broome, Hightower, & Hopkins, 1985 and Cochi et al, 1986) and recurrent otitis media (Stahlberg, Ruskanen, & Virolainen, 1986). Cohort studies have traced the transmission of cytomegalovirus in day cares, between children, and from child to parent or caregiver, through analysis of various strains of cytomegalovirus (Adler, 1988, Murph & Bale, 1988, and Adler, 1989). The cohort type of study has also been used to identify the causes of diarrhea in day care (Bartlett, Moore, Gary, Starko, Erben, & Meredith, 1985), and has analyzed data concerning adenovirus infections and respiratory illness for serotype and frequency (Pacini, Collier, & Henderson, 1987). Reports of investigations following the outbreak of a specific pathogen dominate the literature (Alpert et al, 1986, Gingrich, Hadler, & Ash, 1983, and Paulozzi, Johnson, Kamahele, Clausen, Riley, & Helgerson, 1986). In these investigations, only the day care with the outbreak was studied. Laboratory analysis was used to confirm the presence or absence of pathogens.

Attention has focused on specific infections. The most common are: hepatitis A (Hadler & McFarland, 1986), a virus transmitted via the fecal-oral route; cytomegalovirus (Adler, 1988), a virus transmitted through contact with body secretions; Haemophilus influenzae type b (Fleming, Cochi, Hull, Helgerson, Cundiff, & Broome, 1986), a bacterium transmitted by respiratory droplets; Cryptosporidia (Alpert et al, 1986), a protozoan parasite transmitted by the fecal-oral route; Giardia lamblia (Steketee, Reid, Cheng, Stoegig, Harrington, and Davis, 1989), a parasite transmitted by the fecal-oral route; rotavirus (Pickering, Bartlett, Reves, & Morrow, 1988), a virus transmitted by the fecal-oral route; respiratory tract infections (Fleming, Cochi, Hightower, & Broome, 1987) usually viruses transmitted by respiratory droplets; and otitis media (Henderson &

Giebank, 1986) usually of bacterial origin. These diseases could be broadly categorized as enteric or respiratory infections.

For both enteric and respiratory infections, age appears to be a risk factor. Diapered children under the age of three appear to be most at risk for enteric infections. Sullivan, Woodward, & Pickering (1984) found that the risk for diarrhea in day cares was 17 times higher in children under three years of age. Person-to-person transmission of enteric infection has been documented in several day care studies (Polis, Tuazon, Alling, & Talmanis, 1986, Alpert et al, 1986, and Spika, Parsons, Nordenberg, Wells, Gunn, and Blake, 1986).

Hepatitis A infections have been shown to occur most often between the ages of one and three (Hadler, Erben, Francis, Webster, & Maynard, 1982). Bartlett et al (1985) found that G. lambia was more common in toddlers than in infants, but that for rotavirus the opposite was true; i.e.: rotavirus was more common in infants than in toddlers. The transmission of cytomegalovirus appears to be most prevalent in toddlers (Pass & Hutto, 1984).

Respiratory infections are common in children but there appears to be an increased risk for young children who attend day care regularly (Denny, Collier, & Henderson, 1986). In studying adenovirus infections and respiratory illnesses in children in day care, Pacini et al (1987) found that the greatest incidence was for infants aged six to twelve months with most infections occurring before two years. Wald et al (1991) found that the toddler age group had the most infections in day care. In a population based study (Fleming et al, 1987), it was found that in children under five years of age, one third of upper respiratory infections and two thirds of ear infections could be attributed to day care attendance.

Another respiratory infection is acute otitis media. Several investigators have found day care attendance to increase the risk of otitis media (Daly et al, 1988, Fleming et al, 1987, and Stahlberg et al, 1986). Recurrent otitis media can lead to problems with speech, language, and cognitive development probably caused by difficulties with hearing loss (Holme & Kunze, 1969, Zinkus & Gottlieb, 1980, and Teele, Klein, and Rosner, 1984).

3. Behavioral Diagnosis

a. Behavioral Factors

Although there has been documentation of the presence, spread, and incidence of enteric and respiratory infections caused by specific pathogens, little attention has been given to behaviors that would prevent infection before an outbreak. When there has been an outbreak of enteric infection, handwashing and environmental measures are encouraged. This usually results in a resolution of infection incidence (Polis et al, 1986, Walters et al, 1988, and Pohjanpelto & Ponka, 1985). While respiratory infection has been studied and concern has been expressed, there is little research or recommendations to reduce respiratory infection with the exception of two studies (Gilliss, Holaday, Lewis, & Pantell, 1989 and Monsma, St. Arnaud, & Day, 1989).

There seems to be general agreement that handwashing is of the utmost importance in reducing the frequency and preventing the transmission of enteric infection (Bartlett et al, 1985, Pickering, 1987, and Smith, 1986). Handwashing was first documented and proved to be important in the prevention of transmission of infection by Semmelweis (Castle, & Ajemian, 1987). Larson, (1988) reviewed the literature from 1879 to 1986 in order to examine the link between handwashing and risk of infection.

Her finding was that the prominence of handwashing in infection control was well justified. This has been supported by researchers who have found a reduction in the frequency of diarrhea when strict attention to handwashing was instituted in the day care (Black et al, 1981).

Hepatitis A and cytomegalovirus highlight the concern about handwashing and infection control in day care. Children with hepatitis A are usually either asymptomatic or have flu-like symptoms (Hadler & McFarland, 1986). Symptomatic hepatitis A often does not become visible until adults contract the virus from the children via the fecal-oral route. Similarly, cytomegalovirus is usually asymptomatic for children and adults (Pomeroy & Englund, 1987). Its transmission through contact with body secretions is of concern to mothers of day care children or female day-care workers who convert to positive in the first half of pregnancy because of risk to the fetus (Adler, 1989). Handwashing is crucial in the prevention of the spread of both these infections.

While handwashing is seen to be of great importance in the prevention of the transmission of enteric infection and cytomegalovirus, there are few recommendations on how to cope with respiratory infection. In trying to decrease the transmission of respiratory infection, Gillis et all (1989) introduced the use of sneezer belts for children as part of an educational program for day care staff with significant results. Monsma et al (1990) decreased the incidence of respiratory infection by instituting a handwashing program in a group of grade one handicapped children. There is evidence in the hospital control of nosocomial infections that handwashing is important in the prevention of RSV transmission (Hall & Douglas, 1981).

The use of vaccines can be useful in preventing specific respiratory infections. H. influenzae type b (Hib) infections are contagious and spread most often by respiratory

droplets (Fleming et al, 1986). Immunization of children with Hib vaccine and the use of rifampin as prophylaxis for secondary Hib disease has been recommended for children in day care (Fleming et al, 1986).

Health professionals are aware of the importance of infection control in the prevention of nosocomial infections. However, the knowledge of day care staff regarding prevention of the transmission of infection is limited. In studying the health training and information needs of day care workers, Chang, Hill-Scott, & Kassim-Lakka, (1989) found that day care workers wanted more health related information. He encourages health professionals to play a greater role in day-care programs.

There are few studies that examine the outcomes of an educational program for day care staff in reducing the frequency and transmission of enteric and respiratory infections. The focus, methodologies, sample sizes, and results vary.

Both Black et al, (1981) and Bartlett et al (1988) focused their studies on enteric infection through an educational program for day-care staff only. Following a two month pretest collection of data in four day-care centres, Black et al (1981) instituted a handwashing program that was rigorously monitored in two of the centres. Outcomes following the intervention were measured for 37 weeks. Bartlett et al, (1988) instituted a one-time training program in the third year of a longitudinal surveillance study of infants and toddlers attending day-care centres in Arizona. There was no subsequent monitoring of caregiver practices in Bartlett's study. His sample included 10 intervention and 11 control day-care centres.

Results for these two studies were quite different. Black et al (1981) found that the incidence of diarrhea was decreased by 50%. However, Bartlett et al (1988) found that there was no difference in the diarrhea rates between the intervention and control

centres in the pretraining and posttraining years. The surveillance itself may have affected the incidence of diarrhea as the diarrhea rates were lower in the second year of surveillance than they were in the first year. The study does not differentiate between the failure to modify practices or the failure of modified practices to reduce the occurrence of diarrhea.

In contrast to the previous two studies, Gilliss et al (1989) developed and tested an educational program for day-care workers that focused on both enteric and respiratory infections. Prevention of the spread of infection involved both day-care staff and children. Like Bartlett et al (1988), Gilliss et al (1989) used a one time educational intervention. However, Gilliss et al (1989) did have one booster session four weeks later. The educational intervention took place in 25 day-cares. There was a five week collection of pretest data followed by the intervention in 13 of the centres. Data were then collected at all centres for eight weeks. The intervention took place for a further eight weeks. A significant reduction was found in the incidence of respiratory infection but there was no difference in enteric infection. Monsma et al (1990) was able to reduce respiratory infection with a handwashing program in a group of grade one handicapped children.

While there has been a focus on the hygienic practices of day care staff, the study of Gilliss et al (1989) and Monsma et al (1990) appear to be the first to examine handwashing by children and self-care practices of the children (when they had a respiratory infection) in the prevention of the transmission of infection. Frequent contact between children, lack of fecal continence, mouthing of hands and objects, and the need for hands-on contact by staff enhance the transmission of pathogens in young children (Bartlett et al, 1985).

Although the literature on health education for preschoolers is sparse, it is the belief of several authors that health habits, values, and beliefs about health are formed in early childhood (Ezer & MacDonald, 1982, Nelson & Hendricks, 1988, and Richardson, 1988). Flaherty (1986) studied health behaviors and conceptions of health in four and five-year-old children. It was found that children were aware of behavior that was health promoting and behavior that was deleterious to health. Although there has been little research on self-care activities of children, Johnson & Gaines (1988) feel that this is an important area based on their clinical experience in teaching self-care to parents and children in a day-care centre. Among the self-care activities they taught to children were dental hygiene, handwashing, and prevention of the transmission of colds.

Two behaviors were identified from the preceding literature review as important in the prevention of the transmission of infection in day care. The first was handwashing by staff members. A second important behavior was the self-care practices of the children including handwashing and practices to prevent the transmission of respiratory infection. Before proceeding further, it is important to look briefly at the nonbehavioral factors that may affect the frequency and transmission of infection in the child day care.

b. Nonbehavioral Factors

There are two considerations important in the nonbehavioral factors which have the potential to affect health in day care children. One is the biological and developmental characteristics of children by age group. A second consideration is the environmental characteristics of the individual day-care centre.

Child day care places groups of children in close proximity to each other which facilitates the transmission of infection (Trumpp & Karasic, 1983). As well, the child

returns daily to and from the community which creates more avenues for the transmission of infection. Trumpp et al (1983) suggests several reasons for particular concern with infants and toddlers. The first is that infants and toddlers are susceptible to many infectious agents because of the state of their immune system at this age. A second reason is that while some infections can be serious in adults, the effects in children are quite mild allowing them to spread silently. An example of this is hepatitis A. The third reason for concern in this age group is that the youngest children are not fully immunized which makes them susceptible to whooping cough, measles, mumps, and rubella. A final concern is that diapered children can be both the recipient and the vector in the transmission of infection.

The physical attributes of individual day-care centres can affect transmission of infection in an indirect way (Klein, 1986). Such things as space allotment per child, adequacy of ventilation, number and location of toilets and sinks for handwashing, and the cleanliness of food preparation and eating areas are important and can vary from one day-care centre to another.

Chapter Two: Study Rationale and Hypotheses

A. Study Rationale

There is an increasing need for child day care in today's Canadian society with more and more women returning to work following childbirth. Epidemiological evidence documents the concerns of caregivers, parents, and health professionals regarding health problems in day-cares, especially the frequency and transmission of enteric and respiratory infections. It is not enough to simply document what is happening in infection control (Larson & Oram, 1989). This is particularly true in the

child day-care setting.

Increased health education of child day-care staff is needed (Lopez, Diliberte, & McGuckin, 1988). Some research has been done on outcomes of specific programs but focus methodologies, sample sizes, and results vary. The behavioral diagnosis identified two behaviors as targets of the intervention. The first was handwashing by staff members and the second was self-care activities of children, including handwashing and practices to prevent the transmission of respiratory infection. Gilliss et al (1989) developed and tested a model educational program for child day-care staff that focused on both enteric and respiratory infections, with handwashing and self-care activities as targets of the intervention.

The purpose of this study was to examine the outcomes of an infection prevention/health promotion program in two private Edmonton child day-cares accepting infants and toddlers. The infection prevention/health promotion program was based on the model health education program for day-care workers tested and developed by Gilliss et al (1989).

It should be noted that this was an infection prevention/health promotion program. It contained elements of the concepts of disease prevention and health promotion as outlined by Stachtchenko and Jenicek (1990). The effort to reduce the incidence of enteric and respiratory infections in child day-cares was infectious disease prevention. Increasing self-care activities of children at a time when health habits, values, and beliefs about health are being formed was the health promotion aspect of this program.

B. Hypotheses

The following hypotheses were tested:

1. The children in the private day care receiving the infection prevention/health promotion program will have a significantly lower incidence of enteric and respiratory infection compared to the children in the control day care, following the 12 week posttest data collection period.

2. The children in the private day care receiving the infection prevention/health promotion program will have a significant reduction in the incidence of enteric and respiratory infection from the pretest to the posttest data collection period.

3. The incidence of enteric and respiratory infection in the children at the private control day care will remain relatively constant throughout the data collection period.

4. The private day care receiving the infection prevention/health promotion program will have a significantly lower incidence of children absent due to enteric and respiratory infection than the control day care during the posttest data collection period.

5. The private day care receiving the infection prevention/health promotion program will have a significantly lower incidence of children taking medications at the day care during the posttest data collection period than the control day

care.

C. Predisposing, Enabling, and Reinforcing Factors

There was literature on the social context of day care in Canada and much information concerning the epidemiology of infections in the child day-care centre. However, there was little written and few studies concerning the day care workers themselves. In order to identify predisposing, enabling, and reinforcing factors, the literature on health education, health motivation, health promotion, and the Health Belief Model was examined. Findings from studies on other topics have relevance for the factors that may influence the behavior of day care workers.

Two behaviors were identified as targets of intervention for this health education program: the predisposing, enabling, and reinforcing factors related to handwashing by staff members, and self-care activities of children. These will be discussed individually.

1. Handwashing by Staff Members

Predisposing factors include knowledge, attitudes, beliefs, and perceptions that relate to the motivation to change (Green et al,1980). For day-care staff, knowledge is an important predisposing factor. Lopez et al (1988) found that day-care staff did not have the education to prevent, recognize, control and report communicable infections that are common in day-cares. In the author's clinical experience of private child-day cares, staff had very little formal education in child care.

In Alberta at the present time, there are few educational requirements for caregivers. In the "White Paper on Reforms to Alberta's Day Care Program" (Alberta Family and Social Services, 1990), an upgrading of qualifications for day-care staff was

proposed. The day care director would be required to have the equivalent of the two year diploma in early childhood development or early childhood education offered by community colleges in Alberta. As of September 1, 1991, it was proposed that one worker in six would need the equivalent of a one year certificate. All other workers would be required to have a mandatory 50 hour orientation course. There was little information as to what the 50 hour orientation course would entail. Implementation of these recommendations has been delayed until September of 1992. The two year diploma course has one class where health, nutrition, and safety are discussed. Clinical experience revealed that knowledge of hygienic practices is received on the job. However, staff are eager for more information as has been noted by Chang et al (1989).

A large part of the research on preventive health behavior is influenced or has employed variables from the Health Belief Model (Rosenstock & Kirscht, 1979). The variables of perceived benefits, perceived barriers, and perceived threat have been shown to have a significant correlation with preventive behavior (Becker & Janz, 1987).

The perceived benefits, perceived barriers, and perceived threat may be factors that are influential in the attitudes, beliefs, and values day care workers hold in relation to the prevention of the transmission of infection. If day care workers do not have an understanding of the transmission and control of communicable infections, they may not see handwashing as a procedure that will benefit either themselves or the children they work with. Transmission of infection is not visible to the naked eye. However, knowledge itself does not change behavior. In reviewing education with respect to AIDS (Ross & Rosser, 1989), it was found that unless there is a perception of AIDS as a personal concern that one can do something about, there is no change in behavior. In changing health behavior, the participation of staff is a guiding principle (Erikson,

Green, & Fultz, 1988).

Not only may staff not perceive the value of handwashing, but there are practical barriers to doing the procedure in the first place. In a child day-care, centre staff are responsible for three to eight children per staff member depending upon the age of the children. Young children are very demanding and it is difficult to wash one's hands every time it is appropriate to do so. In a study that examined Health Belief Model variables in relation to breast self-examination (Champion, 1987), it was found that the most important factors were barriers, knowledge, and susceptibility, with barriers accounting for most of the variance.

Perceived susceptibility is also an important factor for day care workers. Studies which have used health risk assessments or health hazard appraisals in addition to health promotion education have showed promising results (Bamberg, Acton, Goodson, Go, Struempler, & Roseman, 1989). An individual's subjective assessment of their risk to a specific threat will influence behavior (Becker & Maiman, 1975).

Enabling factors refer to the skills and resources necessary for a health behavior to occur. The washing of hands does not necessarily mean that it is done in a manner which removes organisms effectively. Knowledge of proper handwashing techniques is important.

A booklet called Contagious Diseases in Daycare (Alberta Community and Occupational Health & Alberta Social Services, 1988) is available for all caregivers and parents. Handwashing is described with suggestions on when it is appropriate. There is no research showing the effectiveness of this as a means of encouraging correct handwashing behavior. Even though health professionals are aware of the importance of handwashing, nosocomial infections continue to be a problem in hospitals.

Day cares do have access to the services of the community health nurse in Edmonton. One half day per month is scheduled in each day care by the nurse responsible. However, few educational programs are instituted by community health nurses for day care staff. Most of their work is in response to a specific problem. Prevention of the transmission of infection is only one of the issues confronting community health nurses in the day care setting.

Reinforcing factors are those factors that are supportive of health promoting behavior. Within the day care setting, there are several sources of support. The first and perhaps most important is the reinforcement among the staff. For handwashing to work, all staff must work at it and be supportive of one another in their efforts to make it a procedure that is done automatically in specified situations. The support and reinforcement of the day care director can set the tone for health promoting behavior. Studies of social support in worksites provide evidence of the value of social support (Morisky, DeMuth, Field-Pass, Green, & Levine, 1985).

The children themselves can also play a role in the support of handwashing behavior. Monsma et al (1990) found that in teaching handicapped children handwashing behavior, the children were reminding and praising the staff for washing their hands appropriately as well as their families at home.

A more indirect form of reinforcement can occur through the process of handwashing itself. It has been the author's experience that if handwashing is begun in earnest and the rates of diarrhea fall, the staff become more committed to this health promoting action.

2. Self-Care Activities of Children

When examining the predisposing factors connected with the self-care activities of children, one is not trying to change behavior so much as developing the knowledge, attitudes, values, and beliefs towards health and self-care for the first time. Bloom first established the importance of the early years (Kaplan-Sanoff & Yablans-Magid, 1981). In studying children's views of health, Natapoff (1978) found that six-year-olds saw health in terms of health practices.

The institution of self-care activities of children is dependent upon the developmental level of the children (Hussey & Hirsh, 1983). Infants are in Piaget's sensorimotor stage of development (Broman, 1982). They learn from sensory experiences, motor activities, and body movements. Children from one to two years can imitate simple tasks (Gordon & Browne, 1989), but the notion of causality does not start to develop until the age of two (Kaplan-Sanoff & Yabland-Magid, 1981). With these young children, modeling behavior will encourage them to imitate the behavior that is desired (Hildebrand, 1990). When day care staff take time to wash hands at appropriate times, they will instill in the children handwashing habits (Broman, 1982).

Preschoolers who can communicate with language (age 2-5) are in Piaget's preoperational stage of cognitive development. Their thinking is primarily focused on external events as opposed to internal events (Perrin & Gerrity, 1981). The preschooler thinks in very concrete terms and is dependent on perceptual cues (Flaherty, 1986). When medicine is given to make children feel better, they do not understand why they are not instantly better. Children will not understand that handwashing removes germs which are something they cannot see, but they do understand that it makes their hands clean.

To develop self-care skills, a child is dependent upon the guidance of parents and caregivers. Trust and respect is essential if preschool children are to feel secure enough to become involved with education (Hussey and Hirsh, 1983). Although this study does not look at the role of parents, it is the day-care staff that spend a majority of the day with the children during the week and they can be instrumental in the development of their self-care skills. There are few developed curricula for handwashing or self-care activities for children, although the Scrubby Bear program in the United States is gaining prominence. Gilliss et al (1989) outline some activities for encouraging self-care for children in a video for day care workers. In Edmonton, Alberta, Worthington (1991) has developed the Germbuster Program for teaching young children about handwashing.

For children, reinforcing factors come from three sources. The parent's praise and reinforcement of the skills being developed is very important. Most parents are very proud of their children's accomplishments, of which self-care is a part. Just as important is the reinforcement of the day care staff. Monsma et al (1990) found that the children needed reinforcement at the time of handwashing rather than at the end of the day. A third source of reinforcement occurs among the children themselves. They are very aware of what others around them are doing and are quick to imitate their peers.

Once the predisposing, enabling and reinforcing factors were identified, it was necessary to choose which would be the focus of the intervention. Knowledge and skill were chosen as the essential first steps in encouraging appropriate handwashing behavior. Day care staff need to know why handwashing is important, when handwashing is appropriate, and the correct technique. A focus on perceived benefits, perceived barriers, and perceived susceptibility is dependent upon knowledge as prerequisites. The same can be said of various enabling and reinforcing factors. The review of the literature on

the epidemiological evidence, studies of day care workers (Lopez et al, 1988), and clinical experience supports the view that knowledge and skill in day care workers is lacking.

It was expected that this approach would also increase perceptions of benefits and susceptibility. In order to put the knowledge and skill into practice, staff would be involved in identifying and working with perceived barriers, thus a change in behavior to preventive action could occur. While reinforcement was not a part of the main focus of the intervention, attention was paid to the factor in the implementation of the health education program.

The intervention for self-care activities of the children was also to focus on knowledge and skill for the same reasons cited above. Knowledge and skill were geared toward the developmental level of the children. Children need to know how they can care for themselves in the prevention of the transmission of infection, when handwashing is appropriate, and the correct technique for handwashing. An indirect result of the intervention would be the development of attitudes, values, and beliefs about self-care and prevention of the transmission of infection by young children.

Chapter Three: Research Design and Methodology

A. Research Design

This evaluation research study was a quasi-experimental, non-equivalent groups design (Brink & Wood, 1989). Two private day-care centres from Edmonton were selected according to certain criteria. During the pretest collection of baseline data, a coin toss decided which day care was to initially receive the intervention and which day care was to serve as the control. Although there was random assignment of the day-cares

to the intervention and control, this was not a true experimental design as the children themselves and/or staff members could not be randomly assigned to the intervention or control group.

Pretest baseline data were collected at both day-cares for five weeks. Following a workshop presentation to the intervention day care, there was a three week period when staff at the intervention day care began to implement the recommendations for control of the transmission of infection. Posttest data were then collected at both day cares for 12 weeks. Twelve weeks was chosen for follow-up based partly on practicality and partly on evidence. Gilliss et al (1989) collected posttest data for 8 weeks initially, then for a further eight weeks when control day-cares received the intervention. Black et al (1981) had a posttest data collection period of 37 weeks. He found, however, that after the second month of posttest data collection, the rates of enteric infection were consistently lower than in the control day-care centre.

Staff members at both day-cares completed the "Questionnaire for Day Care Staff" (Appendix A) and the "Questionnaire for Day Care Director" (Appendix B) before the collection of the pretest data began. At the completion of the posttest data collection, staff members from both day-cares completed the "Self-Assessment for Health Practices" (Appendix C) and the "Knowledge Questionnaire" (Appendix D).

B. Sample

Two private day-care centres in the City of Edmonton were chosen for this study. Private day-cares were specified because in the province of Alberta, 70% of the day-cares are privately owned (Status of Women, 1986). The privately owned day-cares often have fewer educational requirements than municipally funded and private non-

profit centres.

Selection of the day-cares occurred on a voluntary basis according to predetermined criteria (Appendix E). The criteria for selection of the day care were: (1) the day care had to be privately owned, (2) the day care had to accept infants and toddlers, (3) the day-cares chosen had to draw their clients from similar socio-economic and ethnic neighborhoods, (4) there had to be more than 40 children in the day care, (5) the day care had to segregate the age groups for the major part of the day, and (6) both day-cares had to be equivalent in their desire for the intervention. It was expected that there would be 5-10 infants, 10-15 toddlers, and 20-30 preschoolers in each day care. There was no upper limit on the number of children as long as the day-cares chosen had approximately the same number of children.

In order to recruit centres for this study, the researcher first obtained a list of day-cares for the City of Edmonton. They were listed alphabetically according to geographical area. All of the directors in one geographical area were telephoned by the researcher. The purpose of the study was explained and information given concerning the researcher and conduct of the study. Day-care directors interested in the study were asked the Selection Criteria Checklist questions in Appendix E. The director was then informed that the researcher would telephone back and make an appointment to come to the day-care centre if another centre was found with similar characteristics.

Four day care centres were found that were similar and in the same geographical area. Each of these were visited by the researcher. The day care directors gave the author a tour of their facilities. Questions about the study were answered and an explanation given of the various data collection tools and methods and procedures. Of the four day-cares, two were chosen and the directors agreed to participate in the study.

All four of the day-care centres were very similar according to the selection criteria checklist. However, the directors of the two day-cares chosen were the most interested in the study. It was essential to have the interest and cooperation of the director if the purpose of the research was to be realized. Appendix E1 compares the two day-cares chosen as outlined in the Selection Criteria Checklist.

As Appendix E1 shows, the two day-cares were quite similar. The intervention centre was a private day care on a Canadian Armed Forces Base but also accepted children from the community. 60% of the children had parents in the military and 40% of the children were from the community. When the directors of the day-cares were asked about the socio-economic status of parents, both stated they did not have that specific information but were willing to estimate. The intervention centre estimated 25% of parents had an annual income of less than $10,000.00 per year and that 75% had an income from $10-30,000. In the control centre, the director stated there were some parents on welfare but the average annual income was from 18-20,000. When the researcher classified children according to age, infants were 0 to 18 months of age; toddlers were 19 to 36 months of age; and preschoolers were 37-72 months of age. This is a standard format.

C. Methods and Procedures

The instruments used in this study were the same as those used by Gilliss et al (1989). They were adapted to reflect day-care conditions in Alberta with the permission of the originator.

When the two day-care centres were chosen, consent was obtained from the owner (Appendix F) and directors (Appendix G). In the case of the A-Intervention day-care

centre, the Consent for Owner was signed by the Chairman of the Board of the Family Resource Centre, to which the day care reports. The owner of the B-Control day-care centre signed their consent. As soon as the consents were signed, arrangements were made to meet with the staff.

Parents were informed of the study through the "Notice to Parents" (Appendix H). Day-care centre staff distributed the notice to parents when they came to pick up their children. An information session for parents at the beginning of the study was not requested by the directors involved nor by the parents. There were no parents who objected to their child's participation in the study.

At the meetings with day-care staff, details of the study were discussed. A "Time Line" was presented to staff to indicate the overall plan of the study (Appendix I). The methods of data collection were explained in detail and questions were answered. Day-care staff were requested to fill out the "Daily Symptom Checklist" (Appendix J) each day. The number of children present or absent was recorded on the sheet as well as the number of drop-in children. Information on the number of prescription medications being given in the day care (Appendix K) was obtained from the forms currently being used by the day-cares. Prescription medication for respiratory or enteric infection as well as asthma medication was recorded. However, medication unrelated to infection was not recorded. A research assistant contacted the day-care director daily in order to follow-up on children who were absent (Appendix L). The day-care director was asked to keep track of the number of boxes of Kleenex, bottles of liquid soap, and boxes of paper towels used on a monthly basis (Appendix M).

The format for the meetings with staff differed due to the requests of the individual day-care directors. At the A-Intervention day-care centre, the researcher attended an

evening staff meeting at which nearly all staff members were present. At this meeting, consent was obtained from staff members and the "Notice to Parents" (Appendix H) was distributed. The following week, the researcher visited each room at the day-care centre to go over the data collection tools again. At this time, the director and staff were requested to complete the "Questionnaire for Day Care Staff" (Appendix A) and the "Questionnaire for Day Care Director" (Appendix B).

The researcher made two visits to the B-Control day care during the the children's rest period. At the first visit, consents for staff (Appendix G) and the "Notice to Parents" (Appendix H) were given to the day-care director. The following week, the researcher met with staff members of each age group to explain the data collection tools and answer questions on the study. The researcher discussed the consent that was obtained from staff members to ensure it was understood, then requested staff members and the director to fill out the "Questionnaire for Day Care Staff" (Appendix A) and the "Questionnaire for Day Care Director" (Appendix B).

Day-care staff were given two weeks to become accustomed to the data collection tools before the study officially began. The researcher visited each centre weekly during this period of time. At the visits, the researcher individually checked with all staff members to check for difficulties in completing the data collection tools. Staff members were filling them out accurately and seemed to understand the definitions of symptoms on the "Daily Symptom Checklist" (Appendix J). The importance of careful, consistent recording was emphasized.

Two research assistants were hired to phone the parents of children who were absent due to illness. One research assistant was a nursing student and the other a recreation student. Both had previously worked as research assistants for other studies. To ensure

that both were given the same information, they were oriented to the study together. Each research assistant was given responsibility for contacting one day care for the duration of the study and they were not informed as to whether that day care was the control or the intervention day care. Research assistants were requested to telephone the day-care director daily for the names and telephone numbers of the children who were absent due to illness. Following this, they telephoned the parents to complete the "Daily Symptom Checklist for Children Who Are Absent" (Appendix L). The data collection tool was returned to the researcher weekly.

When the initial two week practice run was finished, there was a five week pretest baseline data collection. Towards the end of the pretest data collection period, a coin toss, with the thesis supervisor as witness, decided which day-care centre would be the intervention day care and which day-care centre would be the control. When the pretest data collection period was completed, the intervention began.

D. Ethical Considerations

This study was approved by the University of Alberta Faculty of Nursing Ethics Review Committee. The Edmonton Board of Health was informed that the study would take place. The Community Health Nurses responsible for the centres were invited to the information sessions and to the workshop. They were requested to present any special programs after the study was complete.

Consent was received from the day care owner, directors, and staff (see appendices F and G for sample consent forms). Parents were informed of the study through the Notice to Parents (Appendix H). None of the parents objected to their child's participation in the study.

The control day care received the intervention at the completion of the posttest data collection period. The intervention consisted of the workshop presentation and follow-up visits by the researcher to reinforce and discuss the implementation of workshop recommendations. The follow-up visits by the researcher occurred one week after the workshop presentation and every two weeks thereafter for twelve weeks. The researcher also presented the Germbuster Program to the children of the control day-care centre in September 1991 when staff and children were back from their summer vacations.

Chapter Four: Intervention and Implementation

A. Basis of the Intervention

The intervention was based upon the work of Gilliss et al (1989) who developed and tested a model educational program for day care staff. Educational materials for both staff and children introduced by Gilliss and her colleagues were used, however, some of the details of the plan and intervention differed.

The differences centred around the workshop presentation and subsequent follow-up. In Gilliss's study, the workshop presentation consisted of viewing the video, "Improving Health in Child Care" followed by a general question and answer discussion relating to the material presented. It was an hour in length and took place at the day care during the quiet time just after lunch.

The workshop presentation in this study was more formal with a variety of teaching methods employed. It was an hour and a half in length and occurred in the evening when the children were not present.

In the Gilliss study, there was a booster session four weeks following the intervention when supplies were replenished and questions answered. In this study, the

researcher visited the intervention day care one week following the workshop presentation and every one to two weeks thereafter until the posttest data collection period was completed.

Data collection differed slightly between the two studies. In the Gillis study, there was baseline collection of data for five weeks followed by a break in reporting of data for three weeks while intervention day-cares instituted some of the suggestions made. Data were then collected for eight weeks. At the end of the eight weeks, the intervention took place in the control day-cares and the same procedure was followed with posttest data collected on all day-cares for a further eight weeks.

In this study, there were only two day-care centres involved, compared with the 25 in Gilliss's study. There was a five week collection of pretest data followed by a three week period in which to implement suggestions in the intervention day care. Data were collected during the implementation phase to provide continuity. The posttest data collection continued for twelve weeks.

The same data collection tools were used with some modifications relevant to Alberta. Gilliss administered the "Self-Assessment for Health Practices" (Appendix C) and "Knowledge Questionnaire" (Appendix D) at the booster session while, in this study, it was completed by both the intervention and control day-cares at the completion of the posttest data collection. In addition to Gilliss's instruments, this study collected data on the number of prescription medications given. Information on the number of bottles of soap, boxes of tissues, and boxes of paper towels were used as a measure of the infection rate and the success of implementation.

B. The Intervention

1. Program Goal

The goal of the infection prevention/health promotion program was to decrease the incidence of enteric and respiratory infections in day-care children and staff, as well as to decrease the number of days absent by children and staff due to these infections. A significant reduction in the number of prescription medications given at the day care would reflect a decrease in infections at the day care. The goal of the health promotion part of this program was to increase the self-care activities of the children, including handwashing and the prevention of the transmission of respiratory infections, at a time when the development of habits, values, attitudes and beliefs about health are occurring.

2. Workshop Presentation

The Workshop was presented at the completion of the pretest data collection to the director and staff of the intervention day care. Of 13 full and part-time staff, nine attended. There was at least one representative from each room. The workshop was held in the evening. The director and staff members were paid an honorarium of $20.00 each for attendance at the workshop to provide payment for overtime and to encourage participation.

a. Introduction and Role Play

The outline for the workshop and objectives were presented using overheads. A brief role play was presented by the researcher and the director of the day care. The role play presented two staff members discussing a university student who wanted to work with the day care in preventing the transmission of infections in the day care setting. The

perceptions and feelings of staff before the student came and after the clinical placement was completed are presented in the role play. The purpose of the role play was to articulate some of the feelings the day care staff may have been having about being in a research study on this topic and to indicate the positive benefits that were expected.

b. Chain of Infection

The lecture method of presentation was used for this portion of the workshop. Information regarding the chain of infection was based upon Chapter 19, p. 467-471, of the text, Basic Nursing Theory and Practice by Patricia A. Potter and Anne G. Perry, 1987. Hepatitis A and cytomegalovirus were used as examples to illustrate the chain of infection. The two diseases were used for illustration because they underscored the need for vigilance in infection control in a day-care centre all of the time, and not just when an illness or symptoms are noted.

c. Handwashing

Handwashing as a means of breaking the chain of infection was discussed. Emphasis was placed on how handwashing can interrupt the chain of infection with enteric and respiratory infection.

Correct technique for handwashing was demonstrated. The technique was based upon that described in Chapter 38, p.990-993 in the text, Clinical Nursing Skills and Techniques Basic, Intermediate, and Advanced by Anne G. Perry and Patricia A. Potter, 1986. Day care workers were encouraged to wash their hands with liquid soap for at least 15 seconds (Garner & Favero, 1985) in warm water.

d. Video

The video, "Improving Health in child Care" developed and produced by Gilliss et al (1990) was viewed. This video reinforced what was discussed and introduced the self-care activities of the children.

e. Self-care Activities of the Children

The researcher reviewed self-care activities of the children that were to be introduced into the day care. Children aged two to six were to use sneezer belts when they had a respiratory infection so they could wipe their own noses and dispose of the tissue themselves. Following use of the tissue, it was to be disposed of and the child and day-care worker were to wash their hands.

Day-care workers were asked to explain to the children how to use the sneezer belt and when they would be used. The video suggested talking to the children about how to "Catch a Sneeze" and then having a craft that encouraged the use of Kleenex when the child has a respiratory infection. The younger children could glue a tissue under the nose of a bear while older children could draw a picture of someone "catching a sneeze".

Children aged two to six years were to be encouraged to wash their hands (1) after going to the toilet, (2) when they arrive in the morning, (3) before eating or drinking, (4) after they have touched a child who may be sick, and (5) after they have wiped their nose and disposed of the tissue (Alberta Community and Occupational Health & Alberta Social Services, 1986). Staff were encouraged to have children wash their hands for 10-15 seconds in warm water. It was suggested that staff could sing a song such as "this is the way we wash our hands" with the children as they supervised to

encourage handwashing for the appropriate time period. Day-care staff were encouraged to be creative in teaching children about the prevention of the transmission of infection.

The researcher also recognized that because of the mouthing behavior of infants and toddlers, environmental measures such as the appropriate cleaning of toys and surfaces was important. The staff were informed at the workshop that the researcher would discuss this with the staff when she made follow-up visits.

f. Improving Health in Child Care Manual

Gilliss et al (1989) developed a resource manual which reinforced and supplemented the videotape. A copy of the manual was given to the day care for their use. At this point in the workshop, an explanation was given on the contents of the reference book and how the day care staff might use it.

Previous to the workshop presentation swabs had been taken of various surfaces in the day care such as change tables, toilets, toys, and eating areas. The day after the workshop the agar plates were shown to all of the staff members. The staff were surprised at the growth occurring from what they thought were surfaces they had been cleaning and the need for handwashing was reinforced.

C. Visits by the Researcher

The intervention day care was visited one week after the workshop presentation and every one to two weeks thereafter until posttest data collection was completed. Follow-up procedures and study results have varied in other research done on the outcomes of education of day care staff. Black et al (1981) with rigorous monitoring of staff practices found a 50% decrease in the rate of diarrhea while Bartlett et al (1988)

found no decrease in diarrhea following a one time educational program with no subsequent monitoring. Gilliss et al (1989) found a significant reduction in respiratory disease but no reduction in enteric disease. In choosing a time period for follow-up in this study, the author felt it was important to keep in mind what time period might be possible for follow-up by a community health nurse without making the day care dependent on the nurse. Two weeks was chosen for this study as it seemed a compromise between previous study results and practical realities.

The visits to the day care by the researcher every two weeks was to serve several purposes. The main purpose was to encourage the day care staff in the implementation of handwashing by the staff and self-care activities of the children. A second purpose of the visit was to answer any questions the staff might have had concerning the study or with regard to prevention of the transmission of infection in the day care. The third purpose of the visits was to replenish the supplies of tissues and data collection materials.

The day care staff were anxious for the researcher to visit the first few times after the workshop presentation. The workers in the baby and toddler rooms wanted the researcher to demonstrate correct diapering technique and to discuss their usual procedures and routines in light of the information presented in the workshop. There was also a discussion concerning washing and disinfecting of toys. The researcher suggested getting plastic net bags so that the toys could be run through the dishwasher. There was also some discussion about what products to use for surfaces and toys. The researcher contacted the health inspector who recommended quaternary ammonium products. A list of these products and the companies selling them was obtained for the day care.

In the preschooler rooms the concern was with teaching the children handwashing and self-care. The day care staff did do some of the activities suggested by Gilliss. They introduced the sneezer belts with varying degrees of success. Some staff members found the sneezer belts particularly useful if they wore them themselves. The washing of toys was not as much of a concern in the preschooler rooms as mouthing behavior in this age group is decreased.

D. Follow-Up Teaching to Children about Handwashing

As a follow-up to the teaching day-care staff did with respect to handwashing the researcher contacted the Communicable Disease Nurse at the Charles Camsell Hospital in Edmonton concerning their Germbuster Program (Worthington, 1990). It is a new program for preschoolers specifically designed for teaching handwashing. Sneezer belts were not a part of this program. The researcher made arrangements to use the program materials and was able to present the Germbuster Program to each room of preschoolers at the day care one month after the workshop presentation.

E. Monitoring of the Implementation

In an evaluation study, it is important to monitor the implementation of the intervention (Morris & Fitz-Gibbon, 1978). Monitoring in this study took place in two ways. The researcher kept a log of events as the study unfolded. This log included any communications relevant to the study and all contacts with the day-care directors and staff. It included suggestions made, questions asked, and subjective impressions of the researcher. A report was made of each visit to the intervention day care following the workshop presentation. The following was noted at each visit: (1) date, time, and length

of visit; (2) discussion/questions initiated by day care staff; (3) difficulties with implementation that were encountered by staff; (4) solutions initiated by staff, researcher or both; and (5) observations of the researcher while at the day care with respect to implementation of handwashing by staff and self-care activities of the children.

The day-care director of the intervention day care was asked to keep a record of the implementation of self-care activities as well as any other health related activities. Information collected was relatively informal. The control day care was also asked to keep a record of any health related activities they did with the children.

F. Liaison with the Edmonton Board of Health

The Director of Nursing for the Edmonton Board of Health suggested that the researcher work with the Consultant for Communicable Disease as well as the district supervisors within whose boundaries the day-cares resided. A copy of the thesis proposal was given to the consultant for her comments. When the day-cares were chosen a copy of the proposal was given to the district supervisors involved.

The usual lines of communication with the community health nurse were maintained during the course of the study. No health education programs initiated by community health nurses took place during the study as requested.

The researcher contacted the district supervisor and community health nurse of the health units where the study day-cares were located after the day-cares were chosen for the study. An invitation was extended for the community health nurse responsible for the day-cares to attend the initial meetings with staff where the study was discussed and the data collection tools explained. The community health nurse was also invited to attend the workshop presentation at the intervention day care. Due to other nursing

duties the community health nurses for both day-cares were unable to attend any of these events. The health unit supervisors were informed when the study had ended.

G. Staff Participation

When staff participate in making decisions, more positive results are obtained (Digman & Carr, 19987). In this study every effort was made to make staff feel they were a very important part of the study and involved in the decision making.

This evaluation study examined the outcomes of a health education program for staff and children. It was important to make sure that staff understood that it was the outcomes of the program itself that were being evaluated not the staff themselves. This was emphasized in the initial meetings with the directors and also with the staff. To that end, data collection focused on outcomes rather than evaluating implementation of handwashing and the self-care activities of the children.

H. Attrition and Entry of Staff and Children

At the Intervention day care there were no new staff members hired during the study period. The day care directors did not inform the researcher if a child left or entered the day care on a regular basis. This information is kept on file by the day care and can be retrieved at any time so it was not felt to be necessary to inform the researcher.

I. Problems Encountered During the Study

One of the main problems during the study was the differing support by staff members for the sneezer belts. The belts were not appropriate for the younger toddlers

because they played with them and spread the tissues everywhere. However, staff members with this age group found it helpful to wear the belts themselves.

In the preschooler age group some of the children did not like the sneezer belts and some liked to play with them. One staff member with this group did not accept the idea of the sneezer belts. When the first child she tried it on did not like it she refused to try it again. Her opposition to the idea of the sneezer belt may have had some effect on other staff.

Overall, the support for the sneezer belts was not strong. It was the subjective impression of the researcher that staff members did not spend a lot of time introducing the sneezer belt. While some used it successfully with the children they were caring for, others did not take the time to persist if difficulties were encountered. The Germbuster program was seen by all staff as very successful. A specific teaching program for children regarding the use of the sneezer belts may have been more successful in promoting the use of the sneezer belts and gaining acceptance by staff and children.

In the toddler and baby rooms, handwashing alone was not felt by the researcher to be enough because of the mouthing behavior of children in this age group. A study on environmental contamination found that fecal contamination of inanimate objects and toy balls was common in all of the day-cares they studied (Van, Morrow, Reeves, and Pickering, 1991). Staff were encouraged to wash toys frequently, preferably in a dishwasher. However, this was difficult due to the environment of the day care. There was one dishwasher and it was situated right in the middle of a very small kitchen area. It was difficult to find a time when it could be run with just toys and not interfere with the work of the cook. Staff did try but the time available to wash toys in this manner was limited.

Budget problems at the day care affected the study in several ways. The researcher had suggested using quaternary ammonium products for cleaning surfaces and toys. However, the day-care director had no money to buy these new products. The researcher suggested buying a small quantity for use in the baby or toddler rooms to begin with, but they were unable to do so. As well, part way through the posttest collection of data the director had to cut back on the number of staff. While provincial guidelines were adhered to, the ratio of staff to children was at the minimum allowed.

Chapter Five: Findings and Data Analysis

Data collection tools used in this study included: (1) "Questionnaire for Directors of Day care Centres", (2)" Questionnaire for Staff of Day Care Centres", (3) "Daily Symptom Checklist", (4) "Daily Symptom Checklist for Children Who Are absent", (4) "Medications Given in the Day Care", (5) "Self-Assessment Health Practice Questionnaire", and (6) "Knowledge Questionnaire". The "Questionnaire for Directors of Day Care Centres" (Appendix B) and the "Questionnaire for Staff of Day Care Centres" (Appendix A) were used to assess pretest differences between the two day cares. Posttest differences in knowledge were assessed using the "Self-Assessment Health Practice Questionnaire" (Appendix C) and the "Knowledge Questionnaire" (Appendix D). The remaining data collection tools were used to ascertain enteric and respiratory illness, number of days absent, and number of medications given in the day care. A Monthly Supply Sheet (Appendix L) gave indirect information on the implementation of the study through the collection of data relating to the number of boxes of tissues used, the number of boxes of paper towels, and the number of containers of soap. In this chapter, pretest then posttest differences will be presented first. This will

be followed by the data analysis of the symptoms of illness, days absent due to illness, and the number of medications given in the day care. Data from the Monthly Supply Sheet will be presented following the data analysis. A discussion of reliability and validity will conclude the chapter.

A. Pretest

Appendix B1 gives a comparison of results from the "Questionnaire for Directors of Day care Centres". Appendix A1 compares results from the "Questionnaire for Staff of Day Care Centres" for the intervention and control day-cares.

Comparison of the "Questionnaire for Directors of Day Care Centres" indicates few differences between the two day-cares. The number of children in each day care was quite close (55 in the intervention day care and 50 in the control day care). There were twice as many infants in the intervention day care but the intervention day care was expecting more before the study was to begin. A major difference was that the intervention day care separated toddlers into two groups and preschoolers into two groups while the control day care had all toddlers in one area and all preschoolers in another area. This was not believed to be a problem because the room in the intervention day care with the highest number of toddlers was almost exactly the same as that in the control day care. Because mouthing behavior and incidence of infection decreases in the preschooler age group it was felt by the researcher that having all the preschoolers in one room at the control day care was acceptable though not ideal. The incidence of infection among preschoolers was higher in the intervention day care for both the pretest and posttest data collection periods.

The control day care indicated that the health consultant had provided information

on the prevention of infection in day care. This had consisted of a noon meeting where various aspects of child care was discussed including handwashing, First Aid, and general care of children.

Some differences in staff were noted between the intervention and control day-cares in the "Questionnaire for Staff in Day Care Centres". In the intervention day care 50% of the staff stated that changing diapers was part of their work compared to 71.4% of control staff. In the intervention day care, staff only cared for the children in their assigned room. Staff in the control day care frequently helped one another out in order to give each other a break. 100% of intervention day-care staff stated that diapering procedures were posted while only 28.6% of control day-care staff said they were posted at their day care. Day care staff at the intervention day care helped to prepare or serve foods more frequently (71.4%) than control staff did (42.3%).

The day-care staff at the intervention day care were more experienced than those at the control day care. 71.4% of staff at the intervention day care had worked in child care 49 months or more compared to 14.3% of control day care staff. 100% of staff at the control day care had worked at that particular day care for two years or less while 50% of intervention staff had worked at their day care two years or less and 50% had worked there longer than two years. There were no staff at the control day care who worked 39 hours a week or less. At the intervention day care 15.4% worked 20 hours/week or less and 15.4% worked 21-39 hours/week.

The majority of workers at both day cares had completed grade 12 or some college: 77% for the intervention day care and 85.7% for the control day care. 46.2% of intervention workers and 42.9 of control workers had no courses in Child Development/Education. In the intervention day care 53.8% of workers had 1-3 courses

in child development, while in the control 14.3% had 1-3 courses, 14.3% had 4-6 courses and 28.6% had more than six courses. Although it would appear that the educational level of the control day care was higher, only 14.3% had participated in any health training in the past year compared to 78.6% in the intervention day care.

B. Posttest

The "Self-Assessment Health Practice Questionnaire" (Appendix C) and the "Knowledge Questionnaire" (Appendix D) were used to assess if there were any posttest differences in knowledge between the intervention and control day-cares. Table 1 gives a comparison from the "Self-Assessment Health Practice Questionnaire".

Table 1

Self-Assessment Health Practices

Question		Percent of total	
		Intervention	Control
1. Children wash their hands after going to the toilet:	Always	12.5	100
	Almost always	87.5	0
	Sometimes	0	0
	Rarely	0	0
2. Caregivers wash hands after helping children in bathroom:			
	Always	100	88
	Almost always	0	12
	Sometimes	0	0
	Rarely	0	0
3. Children wash hands before eating or fixing food:	Always	88	100
	Almost always	12	0
	Sometimes	0	0
	Rarely	0	0
4. Caregivers wash hands before fixing or serving food:			
	Always	100	100
	Almost always	0	0
	Sometimes	0	0
	Rarely	0	0

(table continues)

		Percent of total	
		Intervention	Control
5. Children cover their mouths when they cough or sneeze:			
	Always	0	12
	Almost Always	13	0
	Sometimes	75	38
	Rarely	12	50
6. Children use tissues to wipe their noses and throw away the tissues:			
	Always	88	57
	Almost Always	0	0
	Sometimes	0	14
	Rarely	12	29
7. Children can reach the sinks:			
	Yes	100	100
	No	0	0
8. We have liquid soap for children:			
	Yes	100	86
	No	0	14
9. We have liquid soap for caregivers:			
	Yes	100	86
	No	0	14
10. We have paper towels:	Yes	100	86
	No	0	14

(table continues)

		Percent of total	
		Intervention	Control
11. Children or caregivers sometimes use cloth towels to dry their hands:			
	Yes	67	88
	No	33	12
12. Children or caregivers sometimes use bar soap to wash their hands:			
	Yes	0	50
	No	100	50
13. We clean bathroom surfaces such as toilet handles and seats:			
	Every day	80	100
	2-4 times/week	10	0
	1 time/week	0	0
	< 1 time/week	10	0
14. Caregivers use paper towels to turn off the faucet:			
	Always	20	17%
	Almost Always	40	0
	Sometimes	20	0
	Rarely	20	83
15. We wash the diaper area with disinfectant between changing each child:			
	Always	100	83
	Almost always	0	17
	Sometimes	0	0
	Rarely	0	0

(table continues)

		Percent of total	
		Intervention	Control
16. Disposable paper used for the changing surface and thrown away after each child:			
	Always	100	33
	Almost Always	0	0
	Sometimes	0	17
	Rarely	0	50
17. Caregivers wash own hands after changing diapers:	Always	100	100
	Almost Always	0	0
	Sometimes	0	0
	Rarely	0	0
18. Caregivers wash child's hands after changing diapers:			
	Always	75	83
	Almost Always	13	0
	Sometimes	12	17
	Rarely	0	0
19. We put or fix food in the diaper changing area:	Never	100	100
	Sometimes	0	0
	Often	0	0
	every day	0	0
20. Toys and other mouthed objects are washed:	Every day	11.1%	16.7%
	2-4 times/week	33.3%	0%
	1 time/week	44.4%	83.3%
	< 1 time/week	11.1%	0%

Posttest differences in knowledge assessed in the "Self-Assessment Health Practice Questionnaire" were interesting. Some of the teaching in the intervention is reflected in these results. 75% of caregivers in the intervention day care stated that children in their day care sometimes covered their mouths when they coughed of sneezed. In the control day care 37.5% said children sometimes cover their mouths and 59% said they rarely do. When asked if children wipe their noses with a tissue and then throw the tissue away, 87.5% of the intervention day care said children always do that in contrast to only 57.1% for the control day care.

In the intervention day care, 66% of the staff said they sometimes use a cloth towel to dry the hands of themselves or the children. Of the control day care staff, 87.5% sometimes used a cloth towel. Although it is recommended that day-cares use liquid soap rather than bar soap 50% of control day care staff stated they sometimes used bar soap. In turning off a water faucet 83.3% of control caregivers rarely use a paper towel while 60% of intervention caregivers use paper towels always or almost always. When changing diapers intervention day-care staff always (100%) use disposable paper on the changing surface. 50% of control day-care staff rarely use disposable paper on the changing surface. In the intervention day care 33.3% of staff stated toys were washed 2-4 times/week and 44.4% stated it was once a week. Of the control day care staff 83.3% said toys were washed once a week.

Scores on the "Knowledge Questionnaire" ranged from 17-45 with an average of 31.1 for the Control day care. The scores for the Intervention day care ranged from 21-51 with an average of 38.4.

C. Data Analysis

In order to evaluate the impact of the Infection Prevention/Health Promotion Program on infection in day care, data was collected regarding symptoms of illness; the number of days children were absent due to illness; and the number of medications given in each day-care centre. Figures 1, 2, and 3 indicate the changes in these three variables over the course of the study. It should be noted that with regard to symptoms of illness the plot is of respiratory symptoms only. There were very few enteric symptoms recorded throughout the course of the study causing their results to be of questionable value. The graphs for the rate of respiratory symptoms and the rate of medications given at day care show wide variability and a cyclical nature. All three graphs indicate that throughout the study, rates of respiratory symptoms, rates of medications given at the day care, and the number of children absent were higher at the intervention day care than at the control day care. These three graphs illustrate the data with all age groups combined. When the data from each variable are broken down according to age group, similar characteristics are portrayed.

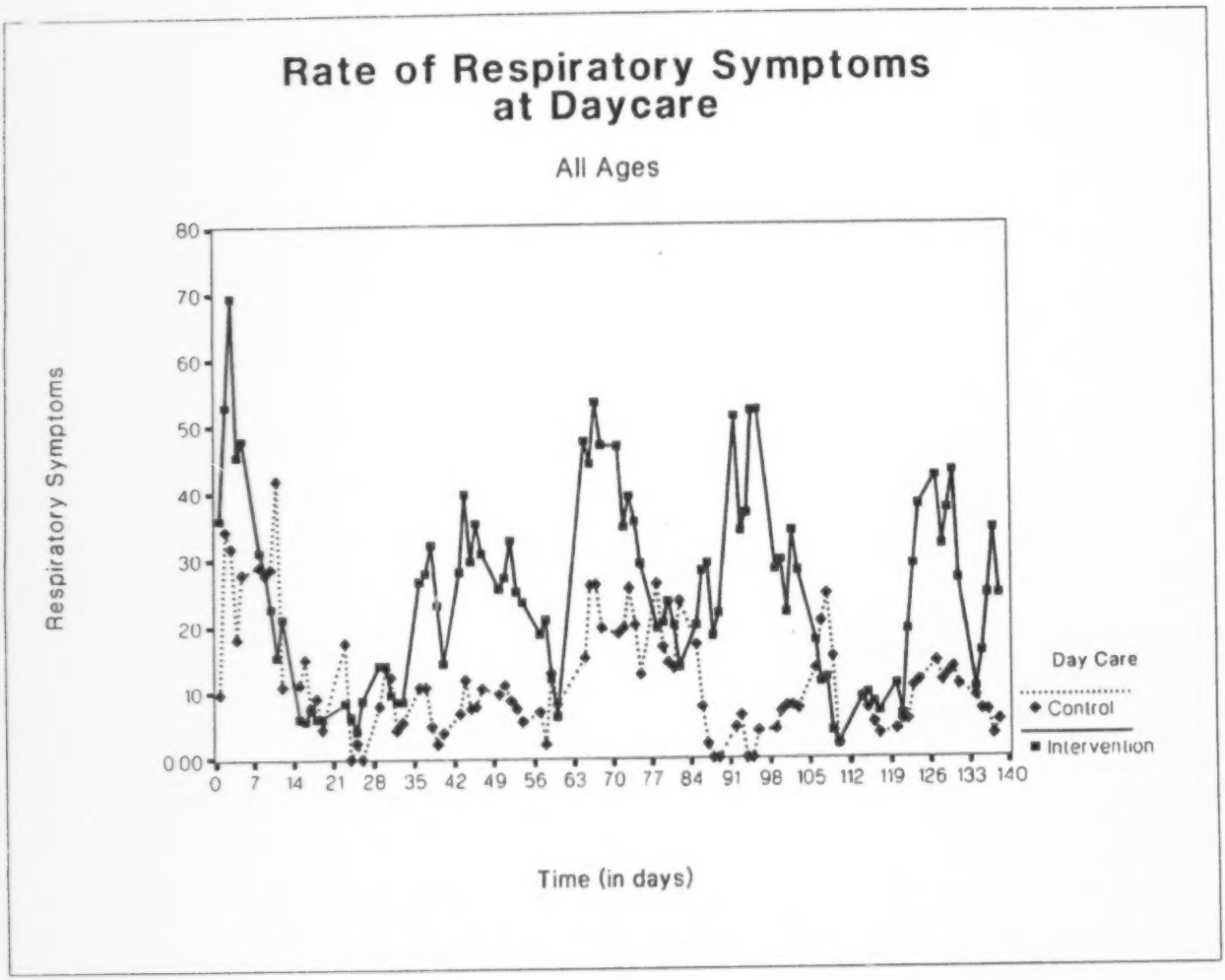
Rate of Respiratory Symptoms at Daycare
All Ages
Respiratory Symptoms
80
70
60
50
40
30
20
10
0 00
0 7 14 21 28 35 42 49 56 63 70 77 84 91 98 105 112 119 126 133 140
Time (in days)
Day Care
Control
Intervention

Figure 1

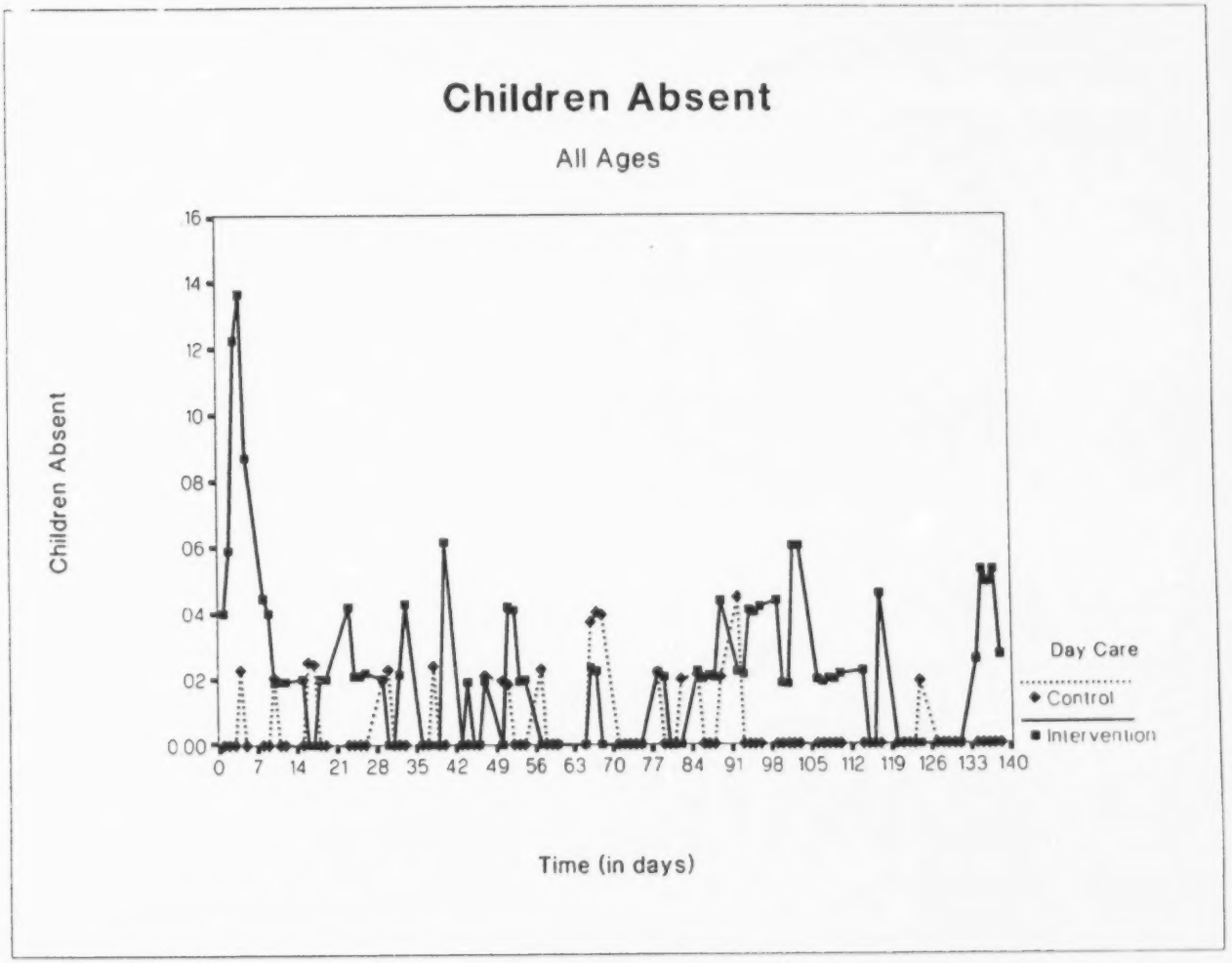
Children Absent
All Ages
Children Absent
16
14
12
10
08
06
04
02
0 00
0 7 14 21 28 35 42 49 56 63 70 77 84 91 98 105 112 119 126 133 140
Time (in days)
Day Care
Control
Intervention

Figure 2

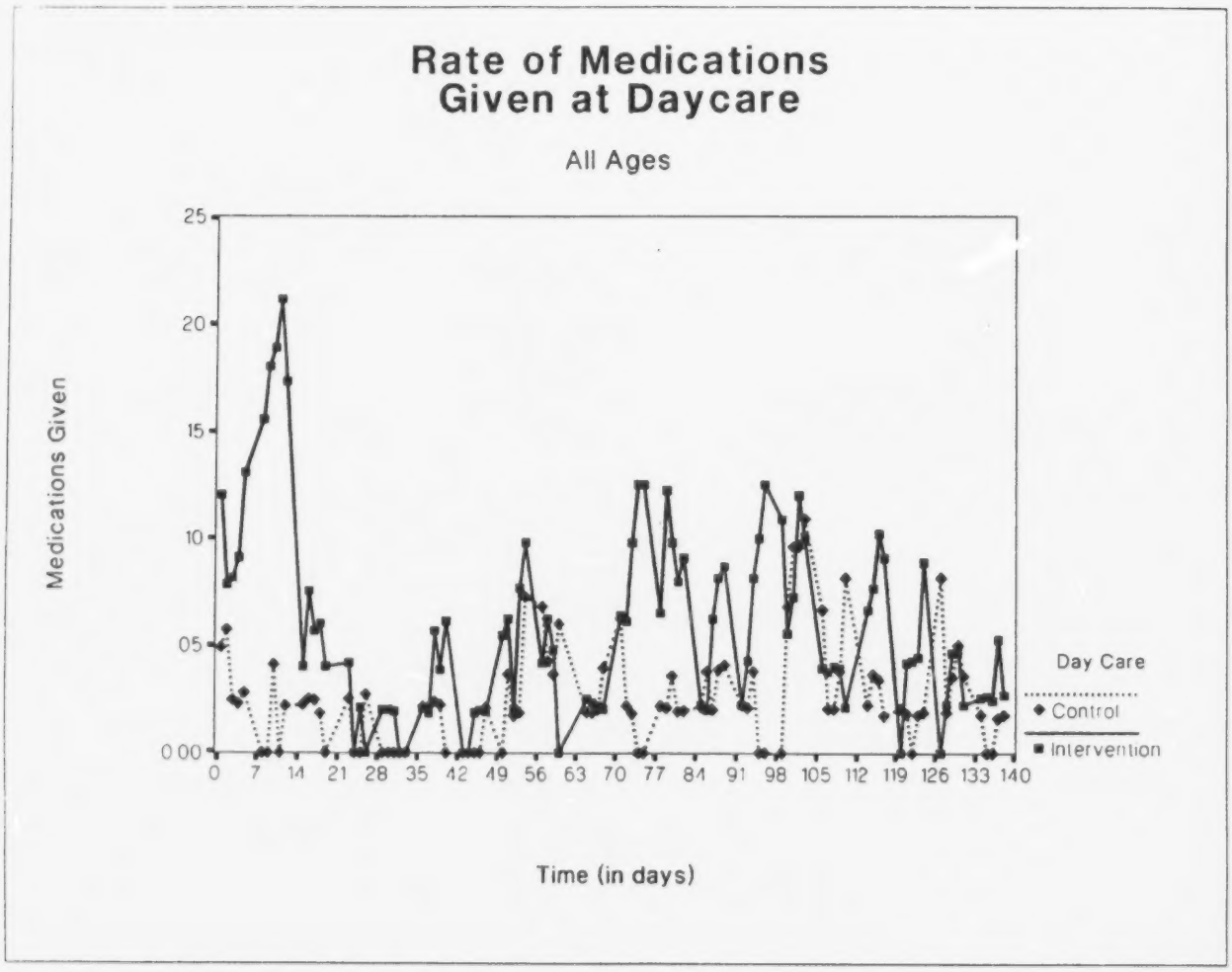
Rate of Medications
Given at Daycare
All Ages
Medications Given
25
20
15
10
05
0 00
0 7 14 21 28 35 42 49 56 63 70 77 84 91 98 105 112 119 126 133 140
Time (in days)
Day Care
Control
Intervention

Figure 3

In order to analyze the number of respiratory symptoms; the number of medications given in the day care; and the number of days children were absent due to illness, two methods were employed. The first method of analysis was to calculate the daily means and standard deviations for each of the variables and then test for significance using t-tests. This allows evaluation of both within groups and between groups differences. Paired t-tests are appropriate for testing differences between a control and an intervention group with a pretest and posttest collection of data. Tables 2 to 7 present the results of this analysis. As was noted previously, the number of respiratory symptoms; the number of medications given in the day care; and the number of days absent due to illness were higher in the intervention day care in both the pretest and posttest data collection intervals. Therefore, the analysis concentrates on within group differences rather than between group differences.

The second method of analysis was time series autocorrelation analysis. Interrupted time series analysis examines how a variable changes over time when there is an intervention (Norman, 1986). The data in a time series are serially correlated. In this analysis the moving averages model was used and the data was differenced because the intervention was expected to have effects that would last over time. A limitation of this type of analysis is that it reveals within group differences but not between group differences.

Tables 2 to 7 and the accompanying discussion present the analysis using t-tests.

Table 2

Respiratory Symptoms by Age Group: Intervention Day Care

Age Group	Pretest	Posttest	Probability
0-18 months	mean: 3.46	mean: 2.81	0.289
	S.D.: 2.65	S.D.: 2.04	
19-36 months	mean: 2.88	mean: 5.63	0.001
	S.D.: 2.74	S.D.: 3.89	
37-72 months	mean: 3.50	mean: 3.71	0.824
	S.D.: 4.15	S.D.: 2.84	
All Ages	mean: 9.83	mean: 12.1	0.257
	S.D.: 8.71	S.D.: 6.4	

In the intervention day care the mean number of respiratory symptoms increased for all age categories from the pretest to the posttest time interval except the infants where it decreased. The increase in the number of respiratory symptoms was most prominent in the toddler age group (19-36 months) where the difference was significant.

Table 3

Respiratory Symptoms by Age Group: Control Day Care

Age Group	Pretest	Posttest	Probability
0-18 months	mean: 1.17	mean: 1.04	0.645
	S.D.: 1.09	S.D.: 1.34	
19-36 months	mean: 4.33	mean: 3.37	0.221
	S.D.: 3.44	S.D.: 2.45	
37-72 months	mean: 1.17	mean: 1.12	0.926
	S.D.: 2.12	S.d.: 1.42	
All Ages	mean: 6.67	mean: 5.53	0.316
	S.D.: 4.93	S.D.: 3.73	

The mean number of respiratory symptoms in all age categories decreased slightly in the control group. However the decreases were small and not significant.

Table 4

Medications Given in Day Care by Age Group: Intervention Day Care

Age Group	Pretest	Posttest	Probability
0-18 months	mean: .96	mean: .67	0.290
	S.D.: 1.20	S.D.: .89	
19-39 months	mean: 1.00	mean: .63	0.227
	S.D.: 1.38	S.D.: .84	
37-72 months	mean: 1.79	mean: 1.45	0.283
	S.D.: 1.41	S.D.: .96	
All Ages	mean: 3.75	mean: 2.75	0.183
	S.D.: 3.39	S.D.: 1.74	

The mean number of medications given in the intervention day-care centre decreased in all age categories in the intervention day care but the differences were too small to be significant.

Table 5

Medications Given in Day Care by Age Group; Control Day Care

Age Group	Pretest	Posttest	Probability
0-18 months	mean: .32	mean: .95	0.001
	S.D.: .58	S.D.: .99	
19-36 months	mean: .25	mean: .23	0.846
	S.D.: .44	S.D.: .50	
37-72 months	mean: .17	mean: .46	0.018
	S.D.: .38	S.D.: .68	
All Ages	mean: .67	mean: 1.63	0.000
	S.D.: .70	S.D.: 1.3	

In the control group when all ages are combined there was a significant increase in the number of medications given in the posttest time interval compared to the pretest time period. When the data is broken down into age groups it can be seen that there is a significant increase in both the infant (0-18 months) and preschooler (37-72 months) age groups.

Table 6

Days Absent by Age Group: Intervention Day Care

Age Group	Pretest	Posttest	Probability
0-18 months	mean: .21	mean: .07	0.217
	S.D.: .51	S.D.: .26	
19-36 months	mean: .54	mean: .48	0.787
	S.D.: .98	S.D.: .66	
37-72 months	mean: .92	mean: .22	0.000
	S.D.: .78	S.D.: .42	
All Ages	mean: 1.67	mean: .77	0.017
	S.D.: 1.63	S.D.: .84	

In the intervention day care there was a significant decrease in the number of days children were absent due to illness when all ages are combined. When the data are broken down into age groups all age groups show a decrease in the number of days absent due to illness but the only decrease that is statistically significant is the preschooler (36-72 months) age group.

Table 7

Days Absent by Age Group: Control Day Care

Age Group	Pretest	Posttest	Probability
0-18 months	mean: .00	mean: .12	0.018
	S.D.: .00	S.D.: .38	
19-36 months	mean: .00	mean: .05	0.083
	S.D.: .00	S.D.: .23	
37-72 months	mean: .25	mean: .07	0.072
	S.D.: .44	S.D.: .26	
All ages	mean: .25	mean: .25	
	S.D.: .44	S.D.: .57	0.971

In the control group the results for the number of days children were absent due to illness were mixed. When age groups are combined the number of days absent for the pretest and posttest time intervals remain constant. If the data is broken down according to age group there are increased days absent by the infant and toddler age groups and the increase in the infant group is statistically significant. The number of days absent by preschoolers goes down but this result is not significant.

In analyzing the time series autocorrelations two comparisons were tested. The first compared the pretest time interval to the intervention and posttest time intervals. A second comparison examined the pretest and intervention time period against the posttest time period. There was only one significant difference noted with either method of

comparison for the control group. There were significantly more medications given to the toddlers (p .0164) in the control day care (19-36 months) in the intervention and posttest time interval compared to the pretest time period.

When the age groups were combined in the intervention day care, there was a significant increase in the number of respiratory symptoms recorded for the intervention and posttest time period as opposed to the pretest time period (p=.0508). When the respiratory data was broken down into age groups there was a significant increase in the number of respiratory symptoms for the toddlers (p=.0065) in the intervention and posttest time period than the pretest time period. For the other variables there were no significant differences when age groups were combined, although the number of days absent and the number of medications given in the intervention day care did show a decrease. Division of the data into age groups for the remaining variables showed a significant reduction (p=.0152) in the number of days children were absent due to illness for preschoolers (37-72 months) in the posttest time period compared to the pretest and intervention time periods.

D. Monthly Supply Data

In order to have an indirect measurement of the implementation of the recommendations of the Infection Prevention/Health Promotion Program, data were collected on the number of paper towels used, the number of boxes of tissues used, and the number of bottles of liquid soap used. A comparison cannot be made from control to intervention, only within the day care itself as the two day-cares used different products.

The data collected on the "Monthly Supply Sheet" are inconclusive. There is not a lot of change in the amounts of items used in the control day care. One might have

expected more towels, Kleenex, and soap used in the intervention day care initially as workers tried to implement recommendations. There might then have been a decrease in their use if infections were reduced. However, this type of pattern does not appear.

E. Reliability and Validity

The instruments that were used in this study, including: (1) Symptom Checklist, (2) Director Questionnaire, (3) Staff Questionnaire, (4) Self-Assessment for Health Practices, and (5) Knowledge Questionnaire, were developed by Gilliss et al (1990). They were based on interviews with nurses, physicians, child development specialists, and child care educators (Gilliss et al, 1990). The instruments were pilot tested in six day-cares before being used in the main part of the study. No reliability statistics are given for these instruments.

The Symptom Checklist was filled out by the day care staff. All staff at both day-cares were oriented to the form and expressed no difficulties with the form itself or with filling it out on a daily basis. The accuracy of their data collection was not tested. There was some staff turmoil in the infant room in the control day care mid-way through the study. However, the day care director did not feel it had affected the collection of data.

The "Self-Assessment for Health Practices" and the "Knowledge Questionnaire" were tested for test-retest reliability at another private day care in Edmonton having over 10 staff members. Eight staff members returned questionnaires one week apart. For the "Knowledge Questionnaire" the range for the first test was 30-61 with a mean of 48.6. Upon retest the range was 30-61 with a mean of 47.9. For the "Self-Assessment for Health Practices" the results were almost identical except for question #1. The first time

the questionnaire was answered 25% stated children always washed their hands after toileting; 25% said almost always; and 50% said sometimes. Upon retest, 12.5% stated children always washed their hands after toileting; 62.5% said almost always; and 25% said sometimes.

For the other outcome measures described, there was only face validity. The multiple outcome measures did add to construct validity.

Chapter Six: Discussion

The PRECEDE model was the framework used to organize and direct this research study. In reflecting upon the findings it is necessary to go back to the model itself in order to analyze all the factors which may have had an impact on the study. In this chapter the author reviews the seven phases of the model in relation to the findings and their possible explanations. The strengths and limitations of the model are also discussed.

The first phase of the PRECEDE framework involved the identification and analysis of a general problem or concern of a particular population. The issue of child care is dominant in Canadian society with over half of the women with children under the age of three returning to work (National Council of Welfare, 1988). Two major national reports (National Council of Welfare, 1988 and Status of Women, 1986) testify to the importance of this topic.

Once the social concern has been identified, the task in phase two of the PRECEDE framework was to assess the epidemiological evidence in order to prioritize health concerns. The PRECEDE model emphasizes that there must be agreement between the health educator and the client as to what the problem is. The clinical experience of the

researcher revealed that parents, caregivers, and health professionals were concerned about the frequency and transmission of infection in the child day-care centre. Epidemiological evidence supported this observation. When the researcher was recruiting day-care centres for this study there was a very positive response with over 75% of the day-care centres telephoned being interested in the study.

Epidemiological research has documented both enteric and respiratory infection in child day-care centres. In this study there were too few cases of enteric infection to make any conclusions. Respiratory infections showed an overall increase in the posttest time period with a significant increase in the toddler age group. What is interesting is that the children did not appear to be as ill in that there was a significant decrease in the number of days children were absent due to illness and a decrease in the number of medications children were given in the day-care centre. One caregiver at the intervention day-care centre noted that in the posttest time period the children all had a runny nose but they weren't what she called "sick" like they were previously when a cycle of illness began. At the control day-care centre during this same time interval, there was a small decrease in respiratory symptoms but a significant increase in the number of medications given and an increase in the number of days absent in the infant and toddler age groups.

Respiratory infection is subject to seasonal variations with epidemics common from September to April or May. The intervention may have had an effect on the impact of a cycle of illness perhaps by decreasing the concentration of microorganisms the immune system had to fight against. Another comparison for respiratory symptoms might be a comparison of the rates from one year to the next within the same setting.

The third phase of the PRECEDE model was to link specific behaviors with the health problems identified. In this study, the behaviors specified as important in the

control of the frequency and transmission of infection were handwashing by staff members and self-care activities of children. There seems to be general agreement that handwashing is important in preventing the transmission of enteric infection (Bartlett et al, 1985, Smith et al, 1986, and Pickering, 1987). The research on preventing the transmission of respiratory infection is limited but studies indicate that handwashing is important (Gilliss et al, 1989, Monsma et al, 1990, and Hall & Douglas, 1981).

A workshop presentation and follow-up visits by the researcher were the means by which it was hoped that acceptable practices of handwashing by day-care staff members could be increased. As a follow-up to the suggestions made in the workshop regarding self-care activities of the children, the Germbuster Program (Worthington, 1990) was presented to the children.

The workshop presentation was well received by staff. Many questions were asked and they were very interested in the material being presented. One staff member stated an honorarium was not necessary to encourage participation in the workshop. When the follow-up visits were made staff were eager to talk to the researcher about practices and routines in light of the recommendations of the workshop.

The Germbuster Program was an excellent way of teaching the children about handwashing. A variety of teaching methods were employed that had appeal to children of this age group. The children were interested and paid close attention. One staff member caring for 4 and 5 year old children noted that after the program the children were doing a good job of washing their hands and were paying more attention to it.

Results from the "Knowledge Questionnaire" would seem to indicate an increase in knowledge for the staff and children of the intervention day-care centre. Their range and the means of test scores were higher than the control day-care centre. Some of the

differences in the "Self-Assessment for Health Practices Questionnaire" would also indicate increased knowledge by day-care staff and children. In turning off a water faucet 83.3% of control caregivers rarely used a paper towel while 60% of intervention caregivers always or almost always did. 75% of caregivers at the intervention day-care centre stated children "sometimes" cover their mouths when they coughed or sneezed (37.5% of control staff said "sometimes" and 50% said "rarely"). 87.5% of intervention day-care staff stated children wipe their noses with a tissue and throw it away compared to 57.1% for the control day care. Toys were washed more frequently at the intervention day-care centre.

While there appears to be an increase in knowledge, there was no actual evaluation of handwashing by day-care staff members or an evaluation of self-care activities of the children. One cannot state for sure that practices were modified. The results of the posttest questionnaires could have reflected knowledge but not necessarily actual practice. An observation of pretest and posttest practices would have provided information about the implementation of handwashing and children's self-care activities.

It is in enteric infection that handwashing as a means of prevention is most strongly emphasized. In this study there were too few cases of enteric infection to make any conclusions. However, in the last week of the study there were several cases of enteric infection in one of the toddler rooms. Because of staff cutbacks there was only one staff member with the children. With the sink and toilet facilities outside of the room appropriate handwashing was difficult.

There was a small decrease in the number of respiratory symptoms in the infant age group but a significant increase in the toddler age group in the intervention day-care centre. The caregivers in the infant room were the most enthusiastic about implementing

workshop recommendations. Their efforts to implement handwashing resulted in complaints about red, sore hands.

Nonbehavioral factors while they do not control behavior, do have an impact on the health problem. The physical environment of the day-care centre is one of these factors. In the control day care toddlers and preschoolers had separate areas and did not interact, but they did share one large room. In the intervention day-care centre each age group had their own room. A large room has more air flow and wider circulation while in a small room the air is confined to a smaller space. This could provide for a greater concentration of microorganisms in the toddler and preschooler areas in the intervention day-care centre and explain the higher infection rate.

The sink and toilet facilities were outside of the rooms. For safety and legal reasons staff had to be careful about absences from their area. This inhibited appropriate handwashing.

Because of the size of the kitchen area in the intervention day care it was difficult to institute a practice of regularly washing the toys. When the dishwasher was running there was little room for the cook to perform her duties. Washing of the toys could only be done late in the day when the cook was gone. This has implications because of the developmental and behavioral characteristics of the infants and toddlers particularly their mouthing behavior. The workers in the infant room did try to wash the toys daily or send them through the dishwasher. However, the workers in the toddler room (where there was a significant increase in the respiratory symptoms) did not wash the toys as often and didn't put them in the dishwasher. Toddlers, especially, are very mobile and able to share toys and the microorganisms that may be present. Wald et al (1991) found that infection in day-care children was most marked in toddlers.

Another nonbehavioral factor that may have had an impact was the environment outside the day-care centre itself, in particular the family environment. In the intervention day care the number of children present remained relatively constant. In the control day care this varied widely. Quite often 6-10 children would be missing from a room, none of them absent due to illness. One might argue that the children frequently going back and forth from the community to the day-care centre would bring more infections into the day-care centre. However, perhaps there were fewer infections because the exposure was less intense. There was also no control over the influence, if any, of siblings of the day-care children.

Phase Four of the PRECEDE framework consisted of identifying the factors which have the potential to affect health behavior. Green (1980) states that behavior has many facets to it. While knowledge may have increased, various aspects of the predisposing, enabling, and reinforcing factors also may have influenced whether the knowledge was translated into practice.

Staff at the intervention day-care centre may have had the attitude that it was impossible or too difficult to wash their hands as often as was necessary. They may have had a belief that illness and day care go together. Green (1980) states that the longer behavior patterns are entrenched the more difficult it is for change to occur.

There were real practical barriers to handwashing in the intervention day-care centre setting. The sink and toilet facilities were apart from the individual rooms. This was particularly important when there were cutbacks in staff. Another practical barrier is the demands of working with children. Toddlers, especially, require supervision and can be very demanding making it difficult to wash one's hands when it is appropriate to do so.

Reinforcement among staff members themselves is important in this type of study.

One staff member was quite adamant about her dislike of the sneezer belts. This may have influenced other staff members who otherwise would have been willing to give them a try and see what the results were. A teaching program instituted by the researcher might have increased support for the use of the sneezer belt by staff and children alike. The sneezer belts proved to be inappropriate for use with the toddler age groups who had the largest increase in the number of respiratory symptoms in the posttest period.

In instituting the self-care activities of the children support from the staff was essential. They and the children were very enthused about the Germbuster Program. However, to make that program work the staff had to reinforce what was taught. With cutbacks in staff they may have gone back to previous practices simply because of time restraints.

When the intervention is developed and implemented in Phase Six of the PRECEDE model, an assessment must be made in relation to administrative factors. One of the administrative factors that may have had a major impact on the study was the budgetary difficulties at the intervention day-care centre. They were unable to purchase the quaternary ammonium products suggested by the health inspectors. As well, around week ten of the study there was a cutback in staff due to budgetary constraints. There was another cycle of illness that started at that time. There is no way to ascertain whether this cycle of illness was just another cycle with no effect from the intervention or whether the decrease in staff inhibited their ability to carry out the recommendations presented in the workshop and in interactions with the researcher.

Staffing patterns may also have had an effect on the frequency and transmission of infection. In the intervention day-care centre they used part-time staff while in the control day-care centre they had full-time employees only. This may have provided an

avenue for more infection to come into the day-care centre, particularly if part-time staff were not as committed to practices to prevent the transmission of infection.

The final phase of the PRECEDE model is evaluation. In using the PRECEDE framework the focus is on outcomes of the intervention. One is encouraged to look first at what you want to achieve, followed by an assessment of what would cause that outcome. While the reverse logic seems appropriate, the inherent danger is that the assessment may be biased to justify the outcome. In this particular study the researcher was concerned about the frequency and transmission of infection in the child day-care centre. The outcome desired was better health for children in day-care centres. It was thought this could be measured by means of a symptom checklist. The number of days children were absent due to illness and the number of prescription medications given in the day-care centre were also thought to be indicators of infection. The "Daily Symptom Checklist" was filled out by day-care staff members. Although there were no indications of difficulty filling out the form there was no means of testing of the accuracy of the recording.

The outcomes in this evaluation research study were mixed. In the intervention day-care centre there was an increase in the number of respiratory symptoms especially among the toddler age group. There was a significant decrease in the number of days children were absent due to illness. In addition to this there was a decrease in the number of medications given in the intervention day-care centre. The study raises many questions.

The PRECEDE model has some strengths but also some limitations. The main strength of the model is that it gives the health educator a step-by-step process with which to develop an intervention. It demands that you identify in a narrow sense the

behavior you wish to modify. By focusing on the outcomes there is a sense of purpose right from the beginning. The broad perspective of the model gives the educator an understanding of the many factors that may be influencing the outcomes.

Some of the very strengths of the model also become limitations. The broad perspective alerts the health educator to the many possible factors affecting behavior. However the model gives no guidance as to which factor should be the priority in modifying health practices. In this study, was knowledge necessary before beliefs, attitudes, and values could change, or was it necessary to change attitudes and values before new knowledge would be accepted? Would handwashing make a difference or were there too many nonbehavioral characteristics to interfere with a positive result?

One of the basic assumptions underlying this model is that behavior is multifaceted. In order to effect change, the intervention must also must be diverse. With this type of approach, it is impossible to isolate which factor made a difference and which factor did not. In this study, one cannot say that handwashing was more important than the washing of toys.

Another limitation is the expertise needed to adequately plan an intervention using this model. The theoretical perspective for any intervention must come from the literature as there is no theory in the model itself. In-depth knowledge is required in epidemiology as well as in education and the behavioral sciences. Every aspect of the model must be carefully researched if the intervention is to be successful. Because of the broad perspective of the model, this is very time consuming. An inadequate knowledge base in one of these areas might result in the theory being applied inappropriately.

Chapter Seven: Summary, Future Research

A. Summary

The PRECEDE framework (Green et al, 1980) was used to organize this evaluation research study. The social problem identified was that of an increasing need in Canadian society for child day care centres. Epidemiological evidence documented the concern of parents, caregivers, and health professionals regarding the frequency and transmission of enteric and respiratory infections. The purpose of the Infection Prevention/Health Promotion Program, in two Edmonton day care centres accepting infants and toddlers, was to examine a proactive approach to infection in this setting. The targets of the intervention were handwashing behavior of the staff, and self-care activities of the children with a focus on increasing knowledge and skill. Outcome measures that were evaluated included the number of days children were absent due to illness; the number of respiratory and enteric symptoms; and the number of medications given in the day care. Enteric symptoms were not evaluated due to the low number of symptoms recorded. There was an increase in the number of respiratory symptoms due mainly to a large increase in respiratory symptoms in the toddler age group. Although not significant, there was a decrease in all age categories in the number of medications given in the day care. There was a significant decrease in the number of days absent for the preschooler age group and when all age groups were combined.

B. Recommendations for Further Research

On the basis of this study, several recommendations for further research can be made:

1. Although the study showed some positive results, the sample size was too small to

draw any definite conclusions. Therefore, the study should be replicated with a larger sample size.

2. There were many environmental factors that may have had an effect on infection in the day care, such as room size, location of sinks and washroom facilities, types of products used for cleaning, availability of a dishwasher to wash toys, and actual staff-child ratios to name a few. An analysis of environmental factors and rates of infection would provide useful data in setting standards for day care environments.
3. There are very few studies of day care workers themselves. A study employing various aspects of the Health Belief Model would yield information that could assist in the planning of educational programs for day care workers.
4. This study should be replicated with a longer time frame so that respiratory symptoms could be compared from year to year.

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Appendix A

Questionnaire for Day Care Staff

QUESTIONNAIRE FOR STAFF OF DAY CARE CENTERS

(See Note 1)

Center Code _____

This questionnaire asks about your background and the types of activities you perform at the center. This information will be used for statistical purposes only. Neither you nor your center will be identified by name or by information which might reveal identity.

1. What is your job title? _____

2. Are you involved in the direct supervision or care of children on a daily basis? Circle one number.
   - Yes 1
   - No 2

3. How frequently is changing diapers part of your work? Circle one number.
   - Every day 1
   - Two to four times per week 2
   - Less than once per week 3
   - Never 4

4. How often do you work with (direct supervision or contact with) children less than two years old?
   - Every day 1
   - Two to four times per week 2
   - Less than once per week 3
   - Never 4

5. How often do you help prepare or serve meals at your center?
   - Every day 1
   - Two to four times per week 2
   - Less than once per week 3
   - Never 4

6. How often do you have the responsibilities for food preparation/service and diapering on the same day?
   - Every day 1
   - Not every day 2
   - Never 3

7. Are diapering procedures posted anywhere in your center?
   - Yes 1
   - No 2

   If yes, where? _____

8. How did you learn diapering procedures?
   - On your own or from a co-worker 1
   - From a book, film, health professional, or instructor 2
   - Other, please specify _____ 3

Note 1: Adapted with permission of Dr. C.L. Gilliss, Dr. B. Holaday, Dr. C.C. Lewis and Dr. R.H. Parrell, University of California, San Francisco

9.	How many months have you worked in child care (total life-time experience)?		☐
10.	How many months have you worked at this child care center?		☐
11.	How many hours per week do you work at this child care center?		☐
12.	Please circle the number corresponding to the education you have completed.	1 to 6 years	1
		7 to 11 years	2
		12 years	3
		some college	4
		college graduate	5
		graduate plus	6
13.	How many courses did you complete in high school or college in Child Development / Education?	None	1
		1 to 3	2
		4 to 6	3
		More than 6	4
14.	How many courses did you complete in high school or college in Health?	None	1
		1 to 3	2
		4 to 6	3
		More than 6	4
15.	Have you participated in any health training courses in the past year?	Yes	1
		No	2
16.	Are you certified to perform CPR (or cardiopulmonary resuscitation)?	Yes	1
		No	2

THANK YOU FOR YOUR RESPONSE !

Appendix A1

Comparison of Day Care Staff Questionnaire

Question		Percent of total: Intervention	Control
1. What is your job title?	day/child care worker	79	100
	day care teacher	7	0
	classroom teacher	14	0
2. Are you involved in the direct supervision or care of children on a daily basis?			
	Yes	100	100
3. How frequently is changing diapers part of your work?			
	Every day	50	72
	2-4 times/week	0	14
	< 1 time/week	22	0
	Never	28	14
4. How often do you work with children less than two years of age?			
	Every day	65	86
	2-4 times/week	0	14
	< 1 time /week	7	0
	Never	28	0

(table continues)

	Percent of total	
	Intervention	Control
5. How often do you help prepare or serve meals at your centre?		
Every day	72	42
2-4 times/week	7	14
< 1 time/week	7	14
Never	14	30
6. How often are you responsible for food preparation & diapering on the same day?		
Every day	36	29
Not every day	21	57
Never	43	14
7. Are diapering procedures posted anywhere in your centre?		
Yes	100	29
No	0	71
If so where?	washroom change area	washroom
8. How did you learn diapering procedures?		
On your own/from a coworker	61	75
From book, film, health professional	22	13
Other specify	17	12
	is a mother is an RNA	is a mother

(table continues)

		Percent of total	
		Intervention	Control
9. How many months have you worked in child care (total life experience)?			
	0-12 months	7	57
	13-24 months	14	0
	25-48 months	7	29
	49 or > months	72	14
10. How many months have you worked at this centre?			
	0-12 months	14	57
	13-24 months	36	43
	25-48 months	21	0
	49 or > months	29	0
11. How many hrs/week do you work at this centre?	0-20	15	0
	21-39 hours	15	0
	40 hours	61	86
	> 40 hours	8	14
12. How many years of education have you completed?			
	1-6 years	0	0
	7-11 years	15	14
	12 years	39	57
	some college	38	29
	college graduate	8	0
	Graduate plus	0	0

(table continues)

	Percent of total	
	Intervention	Control
13. Courses completed in High School/College in child development or education:		
None	46	43
1-3	54	14
4-6	0	14
> 6	0	29
14. How many courses did you complete in High School/College in health?		
None	31	14
1-3	54	57
4-6	7	0
> 6	7	29
15. Have you participated in any health training courses in the past year?		
yes	79	14
no	21	86
16. Are you certified to perform CPR		
yes	54	57
no	46	43

Appendix B

Questionnaire for Day Care Director

QUESTIONNAIRE FOR DIRECTORS OF DAY CARE CENTERS

(See Note 1)

Center Code _____

SECTION I - CHARACTERISTICS OF YOUR DAY CARE CENTER

1. How many children are enrolled at your day care center?

Full time	
Part time	
Drop in	

2. Please indicate the number of children in each age group who are enrolled at your day care center. Please put a zero (0) if your center does not have children of that age group.

00 months to 12 months	
13 months to 23 months	
24 months to 03 years	
03 years to 05 years	

3. Are the children in your center: (circle one)

Separated into age groups for most of the day?	Yes	No
Not separated into age groups for most of the day?	Yes	No

4. How many staff involved with direct care or supervision are employed at your center? [ ]

5. Do you usually have volunteer staff or students at the center? Yes No

6. Please list the number of children who normally occupy each classroom and the approximate size in square metres. Square metres = square feet / 11

	Children	Sq Metres
Room 1		
Room 2		
Room 3		
Room 4		
Room 5		
Room 6		

Note 1: Adapted with permission of Dr. C.L. Gilliss, Dr. B. Holaday, Dr. C.C. Lewis and Dr. R.H. Pantell, University of California, San Francisco

7. Please estimate the percent (%) of families with children at your day care center whose total family income falls in the following categories

	%
Less than $10,000 / year	
$10,000 to $30,000 / year	
More than $30,000 / year	
	100

SECTION II - HEALTH CONSULTANT

8. Is there anyone associated with your center who serves as a health consultant?

Yes
No Go to question 13.

9. Who serves as the health consultant?

Medical Doctor (M.D.)	Yes	No
Community Health Nurse	Yes	No
Registered Nurse other than Community Health Nurse	Yes	No
Other, please specify: _____	Yes	No

10. Please indicate how much he/she works or consults at your center:

Once a week on a regular basis	Yes	No
One to three times per month on a regular basis	Yes	No
Once or more per year on a regular basis	Yes	No
Available for telephone consultation only	Yes	No
Does not regularly come, but in case of problem or emergency	Yes	No
Other, please specify: _____	Yes	No

11. Please circle the items a health consultant has performed at your day care center:

Examined or tested children for health problems	Yes	No
Tested children for developmental problems	Yes	No
Provided telephone consultation	Yes	No
Visited to observe children/consult with staff on possible health problems	Yes	No
Provided classes for staff	Yes	No
Provided classes for parents	Yes	No
Provided classes for children	Yes	No
Other, please specify: _____	Yes	No

12. Within the past year, has your health consultant provided a class or information about prevention of illness in day care centers? Yes No

SECTION III - HEALTH POLICIES

13. Please indicate whether your center has written health guidelines on each of the topics:

a.	What to do if an emergency occurs, i.e.: a severe accident or illness	Yes	No

b.	Standard procedure for reporting accidents to parents		Yes	No
c.	Standard procedure for reporting the presence of infectious disease to parents		Yes	No
d.	Specific steps to take when a child is ill; i.e.: fever, vomiting		Yes	No
e.	Policy for when a child must be sent home, if ill		Yes	No
f.	Specific guidelines for giving medications at your day care center		Yes	No
g.	Other, please specify:	_____	Yes	No

14 Does your center keep absentee records that identify the nature of a:

child's illness?	Yes	No
caregiver's illness?	Yes	No

15. Does your center have a written policy giving guidelines for deciding whether a child may remain at the day care center, or must be sent home if they have the following illnesses?

a.	diarrhea	Yes	No
b.	fever	Yes	No
c.	colds	Yes	No
d.	vomiting	Yes	No
e.	rash	Yes	No
f.	lice	Yes	No
g.	scabies	Yes	No

16. Is there an isolation room or separated area for ill children? Yes No

17 This is a list of illnesses that children and staff who work with young children sometimes experience. Have any of your center's children or staff had any of the following illnesses in the past year? Circle yes if one or more person(s) had the illness.

a.	chicken pox	Yes	No
b.	german measles (rubella)	Yes	No
c.	measles (rubella)	Yes	No
d.	diarrhea (cause undetermined)	Yes	No
e.	giardia (intestinal parasites)	Yes	No
f.	salmonella	Yes	No
g.	shigella	Yes	No
h.	meningitis	Yes	No
i.	lice	Yes	No
j.	scabies	Yes	No
k.	hepatitis	Yes	No

THANK YOU FOR YOUR RESPONSE !

Appendix B1

Comparison of Day Care Directors Questionnaire

Question		Intervention	Control
1. How many children enrolled at your day care?	Fulltime	55	50
	Part-time	1	2
	Drop-in	0	0
2. Indicate the number of children in each age group enrolled at your day care centre:			
	00-12 months	3	6
	13-23 months	7	4
	24-35 months	12	13
	36-72 months	34	29
3. Are the children in your centre separated into age groups for most of the day?		yes	yes
4. How many staff involved with direct care or supervision are employed at your centre?		21	10
5. Do you usually have volunteer staff or students at your centre?		yes	no

(table continues)

6. List the number of children who normally occupy each room and the approximate size in square metres.

		Intervention	Control
Room #1	# children, # m^2	6, 42	10, 65
	m^2/child	7.0	6.5
	age group	infant	infant
Room #2	# children, # m^2	7, 54	13, 70
	m^2/child	7.7	5.4
	age group	toddlers	toddlers
Room #3	# children, # m^2	15, 78	29, 150
	m^2/child	3.5	5.2
	age group	toddlers	preschool
Room #4	# children, # m^2	13, 45	
	m^2/child	3.5	
	age group	preschool	
Room #5	# children, # m^2	15, 48	
	m^2/child	3.2	
	age group	preschool	

(table continues)

		Intervention	Control
7. Estimate the percent (%) of families with children at your centre whose total family income falls in the following Categories:	<10,000/yr	N/A	3%
	10-30,000/yr	N/A	90%
	>30,000/yr	N/A	7%
8. Is there anyone associated with your centre who serves as a health consultant?		yes	yes
9. Who serves as a health consultant?		CHN	CHN
10. Please indicate how much he/she works or consults at your centre.	Once or more / yr on a regular basis	Yes	Yes
	Comes if it's an emergency or problem	Yes	
11. Which items has a health consultant performed at yourcentre?	Tested kids for developmental problems	Yes	Yes
	Telephone consultation	Yes	Yes
12. Within the past year has your health consultant provided a class or information about prevention of illness in day care?		No	Yes

(table continues)

		Intervention	Control
13. Indicate if your centre has written guidelines on each of these topics:			
a. What to do if an emergency occurs		Yes	Yes
b. Standard procedure for reporting accidents to parents		Yes	Yes
c. Standard procedure for reporting infectious diseases to parents		Yes	Yes
d. Specific steps to take if a child is ill		Yes	Yes
e. Policy for when a child must be sent home, if ill		Yes	Yes
f. Specific guidelines for giving medications at your centre		Yes	Yes
14. Does your centre keep absentee records that identify the nature of child's illness			
		No	No
caregiver's illness		No	N/A
15. Does your centre have written policy guidelines for deciding if a child is to be sent home when they have the following:			
	Diarrhea	Yes	Yes
	Fever	Yes	Yes
	Colds	Yes	No
	Vomiting	Yes	Yes
	Rash	Yes	Yes
	Lice	Yes	Yes
	Scabies	Yes	Yes
16. Is there an isolation room or separated area for an ill child			
		No	Yes

(table continues)

17. Have children in your centre had the following illnesses:

	Intervention	Control
Chicken pox	N/A	Yes
German measles	Yes	No
Measles	N/A	No
Diarrhea (cause undetermined)	Yes	Yes
Giardia	No	No
Salmonella	No	No
Shigella	No	No
Meningitis	No	No
Lice	N/A	No
Scabies	No	No
Hepatitis	No	No

Appendix C

Self-Assessment for Health Practices

SELF-ASSESSMENT HEALTH PRACTICE QUESTIONNAIRE

(See Note 1)

Center Code _____

Please use this form to assess how your center is doing right now. The information is completely private, and will be used only to test for changes after the educational program.

1.	Children in our center wash their hands after toileting: Circle one number.	Always	1
		Almost always	2
		Sometimes	3
		Rarely	4
2.	Caregivers wash their hands after helping children in the bathroom:	Always	1
		Almost always	2
		Sometimes	3
		Rarely	4
3.	Children in our center wash their hands before eating or fixing snacks or meals:	Always	1
		Almost always	2
		Sometimes	3
		Rarely	4
4.	Caregivers wash their hands before fixing or serving food:	Always	1
		Almost always	2
		Sometimes	3
		Rarely	4
5.	Children cover their mouths when they cough or sneeze:	Always	1
		Almost always	2
		Sometimes	3
		Rarely	4
6.	Children use tissues to wipe their noses, and throw away the tissues:	Always	1
		Almost always	2
		Sometimes	3
		Rarely	4
7.	Children can reach the sinks (circle one):	Yes	No

Note 1: Adapted with permission of Dr. C.L. Gilliss, Dr. B. Holaday, Dr. C.C. Lewis and Dr. R.H. Pantell, University of California, San Francisco

8.	We have liquid soap for children:	Yes	No
9.	We have liquid soap for caregivers:	Yes	No
10.	We have paper towels:	Yes	No
11.	Children or caregivers sometimes use cloth towels to dry their hands:	Yes	No
12.	Children or caregivers sometimes use bar soap to wash their hands:	Yes	No
13.	We clean bathroom surfaces such as toilet handles and seats:	Every day	1
		2 to 4 times per week	2
		Once a week	3
		Less than once a week	4
14.	Caregivers use paper towels to turn off the water faucet:	Always	1
		Almost always	2
		Sometimes	3
		Rarely	4
15.	We wash the diaper area with disinfectant between changing each child:	Always	1
		Almost always	2
		Sometimes	3
		Rarely	4
16.	We use disposable paper to cover changing surface and throw it away after each child:	Always	1
		Almost always	2
		Sometimes	3
		Rarely	4
17.	Caregivers wash their own hands after changing diapers:	Always	1
		Almost always	2
		Sometimes	3
		Rarely	4
18.	Caregivers wash the child's hands after changing diapers:	Always	1
		Almost always	2
		Sometimes	3
		Rarely	4
19.	We put or fix food in the diaper changing area:	Never	1
		Sometimes	2
		Often	3
		Every day	4

20	Toys and other objects which children put in their mouths are washed:	Every day	1
		2 to 4 times per week	2
		Once a week	3
		Less than once a week	4

THANK YOU FOR YOUR RESPONSE !

Appendix D

Knowledge Questionnaire

KNOWLEDGE QUESTIONNAIRE "A"

HEALTH AND SAFETY PRACTICES IN DAYCARE QUESTIONNAIRE

(See Note 1)

Center Code _____

1. The following items are concerned with toileting procedures with children. Check those items that are true or that are good practices to follow.

Toddlers should be encouraged to go to the toilet alone.	☐
Children's hands should be washed with soap and running water after using the toilet.	☐
Bar soap is as good as liquid soap.	☐
It is unnecessary to clean a child's toilet more than 2 or 3 times a week.	☐
When you are helping a child use the toilet, you do not need to wash your hands unless your hands actually touch the child's feces.	☐
After washing and drying their hands, children should use paper towels to turn off the faucets.	☐
It is all right for the children to share a cloth towel in the bathroom.	☐

2. The following items concern diapering practice. Please check ALL of the items that represent good diapering practice.

When diapering several babies at the same time, it is unnecessary to wash your hands until you have changed all the babies.	☐
You should always keep one hand on the baby when changing him/her.	☐
Each soiled diaper should be placed in a plastic bag.	☐
Washing hands in a bowl is just as effective as washing hands under running water.	☐
It is unnecessary to wash the diapering area thoroughly more than once a week.	☐
Wash your hands with liquid soap after every diaper change.	☐
Diaper babies often, wherever it is convenient.	☐
Disinfect diaper area after every changing.	☐
Put disposable paper under babies bottoms when changing.	☐
Use disposable bottom wipes	☐
Dispose of used diapers in a paper lined diaper pail.	☐
Wash bottoms with a wet washcloth at each change.	☐
Keep a jar of cream for sore bottoms in the diaper area.	☐
Keep a special diapering area away from food.	☐
The diapering area should be near running water.	☐
Keep a hand towel near the sink to dry your hands after washing.	☐
All babies should be changed in the same special area.	☐

Note 1: Adapted with permission of Dr. C.L. Gilliss, Dr. B. Holaday, Dr. C.C. Lewis and Dr. R.H. Pantell, University of California, San Francisco

3. Suppose that you have observed a child with the signs and symptoms below. What should you do? Check all of the alternatives that apply.

	Continue to observe child	Isolate the child	Call the parent right now	Send the child home	Call the Doctor or 911	
Nose is runny with a clear liquid						
Child has no energy, asks to lie down, is listless						
Sore throat and a high fever						
Vomits shortly after complaining of feeling sick						
Has poor appetite						
Green or yellow nasal discharge						
Has a temperature of 101 degrees fahrenheit						
Unusually yellowish skin or eyes						
Three runny stools a day, unusual for this child						
Pulls at ears and awakens early from nap, crying						
Child has a convulsion						
Child gets stuck with a nail and the wound bleeds						
Dark urine at every toileting						
Frequent scratching of head throughout the day						
Red itchy spot on the arm						
Occasional coughing throughout the day						

4. Illness spreads easily in childcare. Check all the following items that are true.

- Toddlers pay little attention to the health habits of the caregiver. ☐
- Sick children should be isolated from others. ☐
- The best way to prevent the spread of illness is by frequent handwashing. ☐
- A clean environment helps prevent the spread of illness. ☐
- Counters and tables should be washed and disinfected at least once a day. ☐
- Every provider should carry a hankerchief to wipe children's noses. ☐
- Children should wash their hands before eating anything, even snacks. ☐
- Every child should have his or her own bedding. ☐
- Frequently mouthed and handled toys need to be washed about once a week. ☐
- Putting washable toys in a dishwasher is a good way to disinfect them. ☐
- You should keep a plastic cup in the kitchen so that children are able to get drinks for themselves. ☐
- No matter what you have been doing, it is important to wash your hands before you handle food. ☐

5. Certain emergency procedures and health practices are important in every child care setting. Check all of the following that are true.

- In case of emergency, call 911. ☐
- Parents' phone numbers should be updated regularly. ☐
- Permission for emergency treatment should be kept in a locked file. ☐
- If you can call 911, you don't need to worry about having a first aid kit. ☐
- Providers can give fever reducing medication when they think it's needed. ☐
- Providers should give parents written guidelines regarding symptoms that mean children ☐

are too sick to come to daycare. ☐

The best time to give parents guidelines about health is when their child is ill ☐

Children's health should be checked every morning before parents leave ☐

When a child gets a dirty wound, such as being stuck with a nail, you need only to wash and band-aid it immediately. ☐

THANK YOU FOR YOUR RESPONSE !

Appendix E

Selection Criteria Checklist

SELECTION CRITERIA CHECKLIST

Center Code _____

1. Private day care? Yes No

2. Accepts infants and toddlers? Yes No

3. Accepts drop-ins? Yes No

4. Separate age groups for most of day? Yes No

5. Ethnic background of parents:

		%
Other		
Total:		100

6. Socio-economic status of parents:

	%
Less than $10,000 / year	
$10,000 to $30,000 / year	
More than $30,000 / year	
	100

7. Number of children in each room:

Infants (00 to 12 months)	
Toddlers (12 to 24 months)	
2 to 3 year olds	
Preschoolers (3 to 5 year olds)	
Total:	

8. Child/Staff ratio:

	Children	Staff	Ratio
Infants (00 to 12 months)			
Toddlers (12 to 24 months)			
2 to 3 year olds			
Preschoolers (3 to 5 year olds)			
Total:			

Appendix E1

Comparison of Selection Criteria

Question		Intervention	Control
1. Private day care		Yes	Yes
2. Accepts infants and toddlers		Yes	Yes
3. Accepts drop-ins		No	Yes (1-2/Wk)
4. Separates age groups for most of the day		Yes	Yes
5. Ethnic background of parents		20% French 80% English/White No Visible Minorities	Variety
6. Socio-economic status of parents		25% <$10,000/yr 75% $10-$30,000/yr	Some Welfare Avg:19,000/yr
7. Number of children in each room	Infants:	6	12
	Toddlers:	14	18
	Preschoolers:	36	30
8. Child/Staff Ratio	00-12 month	3	3
	12-24 month	6	6
	25-36 month	8	8
	37-72 month	10	10

Appendix F

Informed Consent - Owner

Appendix N Informed Consent - Owner

Title of Research: Outcomes of an Infection Prevention/Health Promotion Program in the Child Day Care Centre.

Researcher:
Deborah Phillipchuk
Master of Nursing Candidate
Faculty of Nursing
University of Alberta
Telephone: 459-4293

Supervisor:
Dr. M. Wood
Dean
Faculty of Nursing
University of Alberta
Telephone: 492-6761

Purpose of the Study: The purpose of this study is to test the effect of an educational program for day care staff and children on the amount of illness in a child day care.

Procedure:

Two private day cares in Edmonton have been chosen for this study. A coin toss will decide which day care will get the program first.

The program will start with a workshop on how to stop illness from spreading from one person to another. The workshop will give ideas to staff on how the children can help. Children with a runny nose will be able to wear a Sneezer Belt so that they can learn how to wipe their own noses when they have a cold.

A copy of the medication sheet that parents sign will be given to the researcher with no names on it. A research assistant will phone the parents if a child is absent because they are sick to ask about the illness. Day care staff will keep a record of children who feel unwell each day. Only the first name and initial of the last name will be given. This information will be collected for one month before and three months after the workshop. The researcher will visit the day care every two weeks.

Taking part in this study may not help you directly. However the information from this study may help us to find ways to stop illness from spreading from one person to another in a day care.

Voluntary Participation and Confidentiality:

You do not have to be in this study if you do not want to be. If you decide to take part, you can stop at any time. If you wish to withdraw from the study let the researcher know. Your name will not be included in any reports of this study or in any articles or talks about the study.

If you have any questions or concerns at any time, you can call the researcher, Deborah Phillipchuk (459-4293) or her advisor, Dr. Wood (492-6761).

Consent:

I,_____ , have read this information and agree to be in the study called, "Outcomes of an Infection Prevention/Health Promotion Program in the Child day Care Centre. I have had the opportunity to ask questions about the study and my part in it. The researcher, Deborah Phillipchuk has answered all my questions at this time. I have been given a copy of this consent form.

_____ _____

(signature of participant) (date)

_____ _____

(signature of researcher) (date)

Appendix G

Informed Consent - Day Care Director/Staff

Appendix O Informed Consent - Day Care Centre Director/Staff

Title of Research: Outcomes of an Infection Prevention/Health Promotion Program in the Child Day Care Centre.

Researcher:
Deborah Phillipchuk
Master of Nursing Candidate
Faculty of Nursing
University of Alberta
Telephone: 459-4293

Supervisor:
Dr. M. Wood
Dean
Faculty of Nursing
University of Alberta
Telephone: 492-6761

Purpose of the Study: The purpose of this study is to test the effect of an educational program for day care staff and children on the amount of illness in a child day care.

Procedure:

Two private day cares in Edmonton have been chosen for this study. A coin toss will decide which day care will get the program first.

The program will start with a workshop on how to stop illness from spreading from one person to another. The workshop will give ideas to staff on how the children can help. Children with a runny nose will be able to wear a Sneezer belt so that they can learn how to wipe their own noses when they have a cold.

A copy of the medication sheet that parents sign will be given to the researcher with no names on it. A research assistant will phone the parents if a child is absent because they are sick to ask about the illness. Day care staff will keep a record of children and staff who feel unwell each day. Only the first name and initial of the last name will be used. This information will be collected for one month before and three months after the workshop. The researcher will visit the day care every two weeks.

Taking part in this study may not help you directly. However, the information from this study may help us to find ways to stop illness from spreading from one person to another in a day care.

Voluntary Participation and Confidentiality:

You do not have to be in this study if you do not want to be. If you decide to take part you can stop at any time. Taking part or not taking part will not affect your job. If you wish to withdraw from the study let the researcher know. Your name will not be included in any reports of this study or in any articles or talks about the study.

If you have any questions or concerns at any time, you can call the researcher, Deborah Phillipchuk (459-4293) or her advisor Dr. Wood (492-6761).

Consent

I,_____ , have read this information and agree to be in the study called, "Outcomes of an infection Prevention/Health Promotion Program in the Child Day Care Centre". I have had the opportunity to ask questions about the study and my part in it. The researcher, Deborah Phillipchuk has answered all my questions at this time. I have been given a copy of this consent form.

_____ _____

(signature of participant) (date)

_____ _____

(signature of researcher) (date)

Appendix H

Notice to Parents

Appendix P Notice to Parents

A research study called "Outcomes of an Infection Prevention/Health Promotion Program in the Child Day Care Centre" will take place in your day care centre.

Researcher:
Deborah Phillipchuk
Master of Nursing Candidate
Faculty of Nursing
University of Alberta
Telephone: 459-4293

Supervisor:
Dr. M. Wood
Dean
Faculty of Nursing
University of Alberta
Telephone: 492-6761

Purpose of the Study: The purpose of this study is to test the effect of an educational program for day care staff and children on the amount of illness in a child day care.

Procedure:

Two private day cares in Edmonton have been chosen for this study. A coin toss will decide which day care will get the program first.

The program will start with a workshop on how to stop illness from spreading from one person to another, The Workshop will give ideas to the staff on how the children can help. Children with a runny nose will be able to wear a Sneezer Belt so that they can learn to wipe their own noses when they have a cold.

A copy of the medication sheet that parents sign will be given to the researcher with no names on it. A research assistant will phone parents if a child is absent because they are sick to ask about the illness. Day care staff will keep a record of children who feel unwell each day. The first name and initial of the last name, only, will be on the sheet. This information will be collected for one month before and three months after the workshop. The researcher will visit the day care every two weeks.

Outcomes: Day Care

The information from this study may help us to find ways to stop illness from spreading from one person to another in a day care. Your child may learn ways to care for themselves when they aren't feeling well.

Voluntary Participation and Confidentiality:

Your child does not have to be in this study if you do not want her/him to be. Taking part or not taking part will not affect the care your child receives at the day care.

Your name or your child's name will not be included in any reports of this study or in any articles or talks about the study if you participate or do not participate.

* If you do not want your child to be in this study please let the day care or researcher know.

If you have any questions or concerns at any time, you can call the researcher, Deborah Phillipchuk (459-4293) or her advisor Dr. Wood (492-6761). You can withdraw from this study at any time. Please let the day care or researcher know.

Appendix I

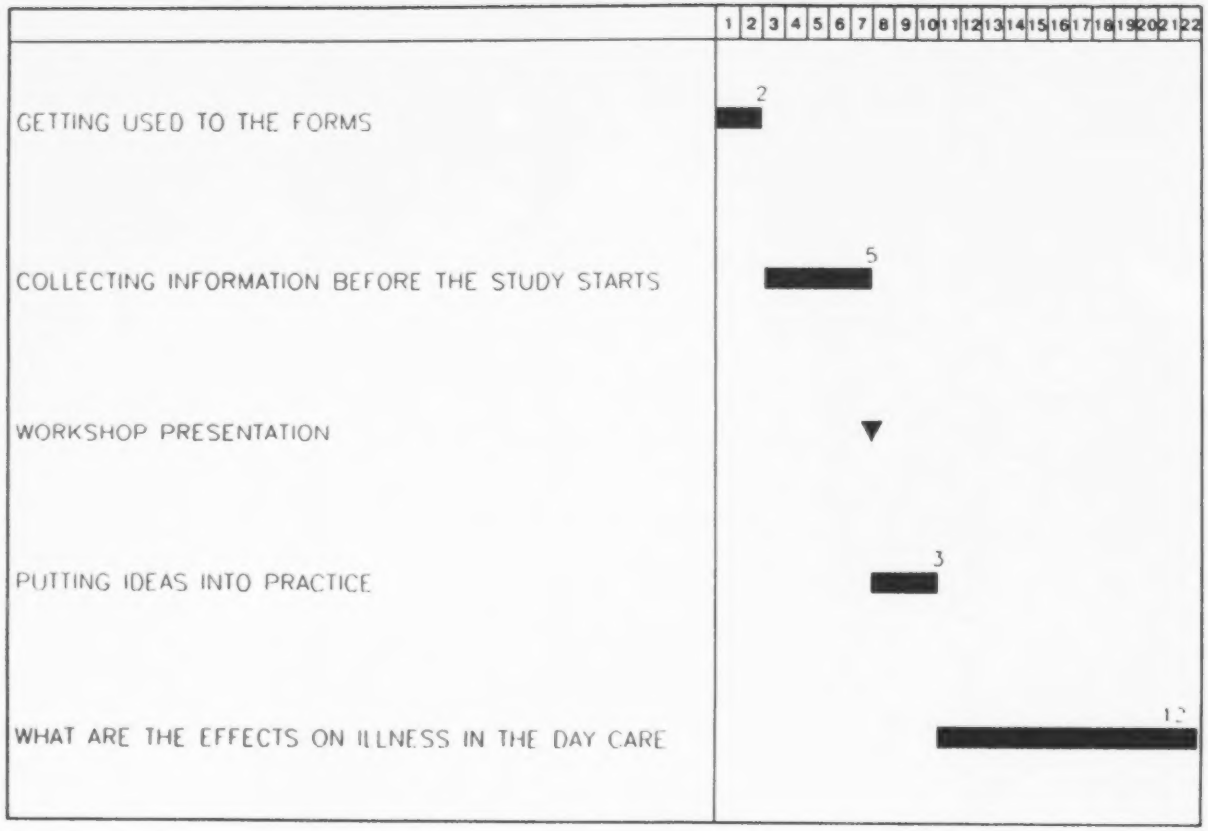
Time Line

TIME LINE

– in weeks –

(time01.mis)

1990.9.29


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22
GETTING USED TO THE FORMS
2
COLLECTING INFORMATION BEFORE THE STUDY STARTS
5
WORKSHOP PRESENTATION
PUTTING IDEAS INTO PRACTICE
3
WHAT ARE THE EFFECTS ON ILLNESS IN THE DAY CARE
12

Appendix J

Daily Symptoms Checklist

DAILY SYMPTOM CHECKLIST

(See Note 1)

Center Code ____
Form #01

Date: _____
Age Group: _____
Number of children/staff present today: _____/
Number of children/staff absent today: _____/

Please write below the names of any children or caregivers who have any of the following symptoms today and check which symptoms. See reverse side for definition of symptoms.

	First name and last initial	Age, in yrs or mo	Diarrhea (loose stool)	Vomiting	Fever	Runny Nose	Cough	Sore Throat	Rash	Eyes, red or Runny	Ear-ache	Other, please specify	Action Taken: 1 = none 2 = isolated child 3 = sent child home 4 = other, please specify
1.													
2.													
3.													
4.													
5.													
6.													
7.													
8.													
9.													
10.													
11.													
12.													
13.													

Note 1: Adapted with permission of Dr. C.L. Gilliss, Dr. B. Holaday, Dr. C.C. Lewis and Dr. R.H. Pantell, University of California, San Francisco

DEFINITIONS OF SYMPTOMS

Diarrhea - stool which is very loose in consistency.

Fever - greater than 101 degrees Fahrenheit
greater than 38.3 Celsius
or child feels warm.
Please record temperature if taken, and how taken (i.e. mouth, arm, etc.).

Runny nose - anything dripping from child's nose - clear, white, yellow, or green.

Cough - any amount of coughing

Sore Throat - child complains throat hurts or says it is difficult to swallow.

Rash - any skin rash except bruising.

Eyes, Red or Runny - reddening of the whites of the eyes or lids sticking together, or white/yellow/green material leaking from eye.

Ear Ache - child complains ear hurts or parent explains child diagnosed with ear ache.

Other - child appears very tired, unable to play

DAILY SYMPTOM CHECKLIST

INSTRUCTIONS

1. This checklist is to be filled out every day sometime after lunch.
2. Each age group or room will have a separate checklist.
3. Fill in the date and age group.
4. All fulltime, part-time, and drop-in children are to be included in counting the number of children present.
5. Children who are expected to be at the day care but are absent are counted as absent for that day.
6. Children who are sent home before noon are counted as absent.
7. Only the first name and initial of the last name are to be given for those children/staff not feeling well.
8. For children under two years, give the age in months.
9. Check off each symptom the child has on that day. A description of the symptoms is on the reverse side of the checklist.
10. After checking off the symptoms, state if any action was taken.
11. Day care staff are to inform the director of the children who are absent but were expected to be there.
12. The checklist is to be given to the day care director when completed.

Note: Do not include those children whose parents do not want them to participate in this study. Their symptoms are not to be listed and they are not counted as present.

Appendix K

Medications Given in the Day Care

MEDICATIONS GIVEN IN THE DAY CARE

Center Code _____
Form #02

	Year	Month	Day	Name Of Medication	Number of Children Receiving That Medication
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					

MEDICATIONS GIVEN IN THE DAY CARE

PROTOCOL

1. A carbon copy will be made of the daily medication sign-in sheet used by the day care.

2. The copy of the daily medication sign-in sheet given to the researcher will not have any names written on it.

3. The day care director will put the copy of the daily medication sign-in sheet in the self-addressed, stamped envelope to be sent to the researcher every Friday.

4. The researcher will transfer the information from the daily medication sign-in sheet to Form #02: Medications Given In The Day Care.

Appendix L

Daily Symptom Checklist for Children Who Are Absent

DAILY SYMPTOM CHECKLIST FOR CHILDREN WHO ARE ABSENT

(See Note 1)

Center Code ____
Form #03

Please write below the names of any children who have any of the following symptoms today and check which symptoms. See reverse side for definition of symptoms.

	First name and last initial	Age, in yrs or mo	Diarrhea (loose stool)	Vomiting	Fever	Runny Nose	Cough	Sore Throat	Rash	Eyes, red or Runny	Earache	Other, please specify	Action Taken:
1.													
2.													
3.													
4.													
5.													
6.													
7.													
8.													
9.													
10.													
11.													
12.													
13.													
14.													
15.													

Note 1 Adapted with permission of Dr. C.L. Gilliss, Dr. B. Holaday, Dr. C.C. Lewis and Dr. R.H. Pantell, University of California, San Francisco

DP.10/15/90

ABSENT01.XLS

DEFINITIONS OF SYMPTOMS

Diarrhea - stool which is very loose in consistency.

Fever - greater than 101 degrees Fahrenheit
greater than 38.3 Celsius
or child feels warm.
Please record temperature if taken, and how taken (i.e. mouth, arm, etc.).

Runny nose - anything dripping from child's nose - clear, white, yellow, or green.

Cough - any amount of coughing

Sore Throat - child complains throat hurts or says it is difficult to swallow.

Rash - any skin rash except bruising.

Eyes, Red or Runny - reddening of the whites of the eyes or lids sticking together, or white/yellow/green material leaking from eye.

Ear Ache - child complains ear hurts or parent explains child diagnosed with ear ache.

Other - child appears very tired, unable to play

DAILY SYMPTOM CHECKLIST FOR CHILDREN WHO ARE ABSENT

PROTOCOL

1. The research assistant will contact the day care director at a time that is mutually agreeable.

2. The day care director will give the research assistant the names and telephone numbers of the children who were expected to be present but were absent that day. Children who were sent home before noon will be included here.

3. If the family does not have a telephone or does not wish to have their telephone number given out, the day care staff will fill out the "Daily Symptom Checklist For Children Absent" when the child returns to day care.

4. The research assistant will telephone that same evening the parent or guardian of each child absent.

5. The research assistant will attempt to contact a particular parent or guardian three times if necessary in the evening.

6. If the research assistant is unable to contact the parent or guardian, he/she will try the following night. (The research assistant should check with the day care director for further information and the correct telephone number.)

7. If, after two days, the research assistant is unable to contact a parent or guardian, this will be documented on the "Daily Symptom Checklist For Children Absent". No further attempts will be made at contact.

8. The research assistant will fill in the "Daily Symptom Checklist For Children Who Are Absent" over the telephone with the parent or guardian.

9. For children under age two years, give the age in months.

10. Under the section, "Action Taken", state if a child was taken to a physician, the diagnosis, and any medications prescribed for the child.

11. If the child's absence was not due to illness that should be stated under the section "Action Taken", no further information on the child's absence is to be requested.

12. The "Daily Symptom Checklist For Children Absent" is to be placed in a self-addressed, stamped envelope to be sent to the

researcher every Monday.

13. Staff who are absent can fill in this form for each day absent when they return to work.

Appendix M

Monthly Supply Sheet

MONTHLY SUPPLY DATA

Center Code: _____ Year: _____
Form #03 Month: _____

A. Paper Towels

Number present on first day of month:	_____	boxes
Add: Additional supplies received:	_____	boxes
Subtotal:	_____	boxes
Subtract: Number present on last day of month:	_____	boxes
Total Paper Towels:	_____	boxes

B. Kleenex

Number present on first day of month:	_____	boxes
Add: Additional supplies received:	_____	boxes
Subtotal:	_____	boxes
Subtract: Number present on last day of month:	_____	boxes
Total Kleenex:	_____	boxes

C. Liquid Soap

Number present on first day of month:	_____	bottles
Add: Additional supplies received:	_____	bottles
Subtotal:	_____	bottles
Subtract: Number present on last day of month:	_____	bottles
Total Liquid Soap:	_____	bottles

MONTHLY SUPPLY DATA

INSTRUCTIONS

1. The day care director or person designated by the director will complete this form every month.

2. The number of boxes of paper towels, the number of boxes of Kleenex, and the number of bottle bottles of liquid soap are to be counted on the first working day of the month.

3. Boxes of paper towels, boxes of Kleenex, and bottles of liquid soap currently in use will not be counted.

4. New supplies of paper towels, Kleenex, or liquid soap received during the month are to be recorded.

5. The number of boxes of paper towels, the number of boxes of Kleenex, and the number of bottles of liquid soap are to be counted on the last working day of the month.

6. Form #04, "Monthly Supply Data", is to be completed and sent to the researcher in a self-addressed, stamped envelope at the end of the month. N.B.: This study may not begin on the first of the month. Therefore, this form will be completed for whatever time period remains of the starting month. If less than two weeks remain in the month from the starting date, use of the form will start at the beginning of the next month. Use of this form begins with a two week period in which day care staff are first learning to fill out the forms needed for the study.